Moving Ahead in ARITHMETIC

BRUECKNER · MERTON · GROSSNICKLE

BOOK THREE

Moving Ahead in ARITHMETIC

Book 3 of Original Series
from the year 1963

Contents

1	Addend—sum relationship ● Order and grouping of addends ● Addition, subtraction—sums through 10 ● Zero as an addend ● Number sentences ● Writing number sentences for problems ● Three addends—sums through 10 ● Ordinals through tenth	1
2	Numeration System ● Counting by 2's, 5's and 10's ● Adding with regrouping ● Addition, subtraction—sums through 12 ● Three addends—sums through 19	42
3	Adding and subtracting with regrouping ● Addition, subtraction—sums through 14 ● Fractional parts of one ● Fractions used in making comparisons	86
4	Addition, subtraction—sums through 18	120

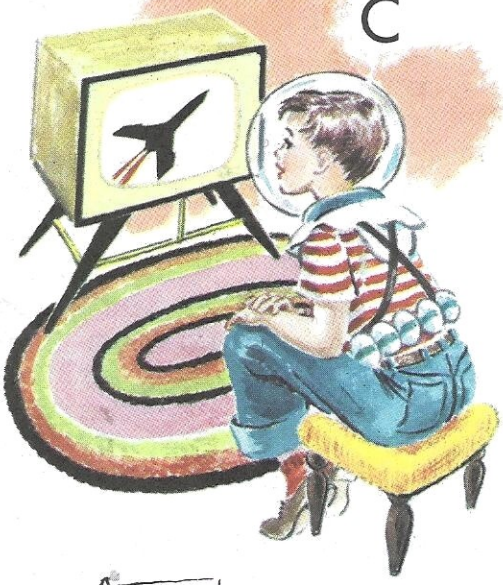
Copyright © 1963, 1959 by Holt, Rinehart and Winston, Inc.
Portions of this book previously copyrighted under the title
Making Number Discoveries
All rights reserved
Printed in the United States of America
41137-0313

567890 H 98765

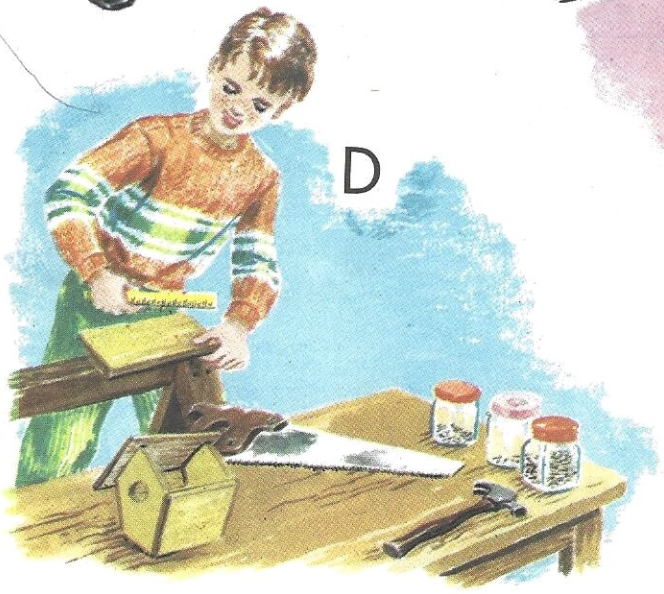
Chapter 1

A

B


C

SEPTEMBER
S M T W T F S
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30


D

E

We Use Numbers Every Day

On the page at the left and on this page, children are using numbers.

1. Picture **A**: Bob wants to ask Tom to come over and see his new rocket toy. How must he use numbers?

2. Picture **B**: Jane wants to get to school on time. How will numbers help her?

3. Picture **C**: Joe is watching the TV show he likes best. Tell two ways he must use numbers to see this show.

4. Picture **D**: How is Jim using numbers to make the bird house? What other measures do children use?

5. Picture **E**: Sally wants to show you when her next birthday comes. How is she using numbers?

6. Picture **F** below: Each day Jack eats lunch in the school lunchroom. How does he use numbers?

7. Picture **G** below: On the playground these children are playing a game. What is the game? How will they use numbers?

8. Children use numbers in many other ways at home, at school, and in games. How many other ways can you tell about?

F

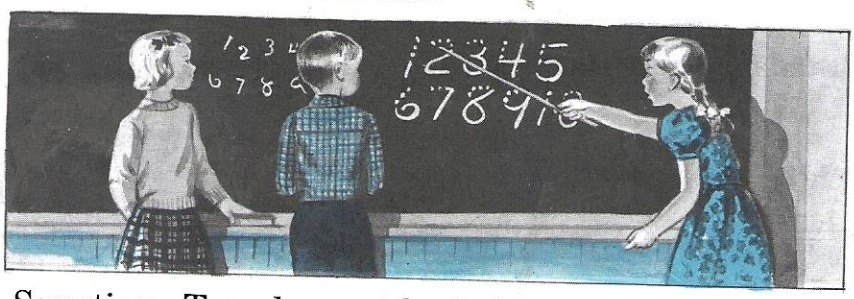
G

Tom Joe

Off to a Good Start

We think a **number.** Any written **number name** such as 4 or (3 + 1) is called a **numeral.** Pat says, "If it can be erased, I know it is a numeral."

Which of the two boys above has written numerals plainly and neatly? Tell what is wrong with each numeral Tom has written on the blackboard.



Sometimes Tom does not begin his numeral at the right place. In the picture above, the dots tell where to begin to make each numeral. Point to the starting place on each numeral as Peggy is doing.

The numerals from 0 to 9 are called **digits.** We call 9 a **one-digit** numeral. We call 10 a **two-digit** numeral.

1. Write the numerals from 1 to 10. Practice until you can write each digit plainly and neatly.

2. Read below the word names of the numbers from 1 to 10.

one	two	three	four	five
six	seven	eight	nine	ten

Pictures Tell Addition Stories

1. How many yellow birds are in picture A? How many red birds are in picture A? How many birds in all do you see in picture B?

2. The **group** of 3 birds has joined the **group** of 2 birds to make one larger **group** of 5 birds. What number fact does this show?

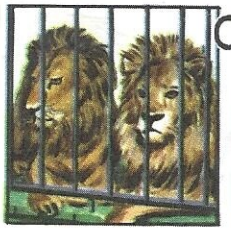
We put together two smaller groups. We made one larger group.

We find the number of birds in all by addition.

3. Put these groups together to make one larger group.
   a. 2 books and 2 books b. 3 boys and 2 boys

4. How many lions are there in the two cages in C below? Draw a picture to show the two groups of lions put together in one large cage. This will make one larger group. How many lions are 2 lions and 3 lions?

5. Do the same with the pictures of the bears. How many bears are 3 bears and 3 bears?

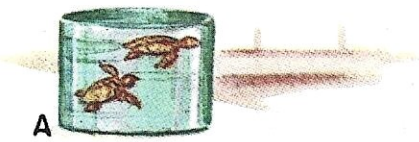


How many kittens are in the basket?

How many more kittens are coming?

How many kittens are now in the basket?

3 and 2 are how many?



How many turtles are in the tank?

How many more turtles is Tom bringing?

How many turtles are now in the tank?

2 and 2 are how many?

Learning from Pictures What Adding Means

1. Tell the above story about Betty's kittens.
2. Now tell about Tom's turtles.

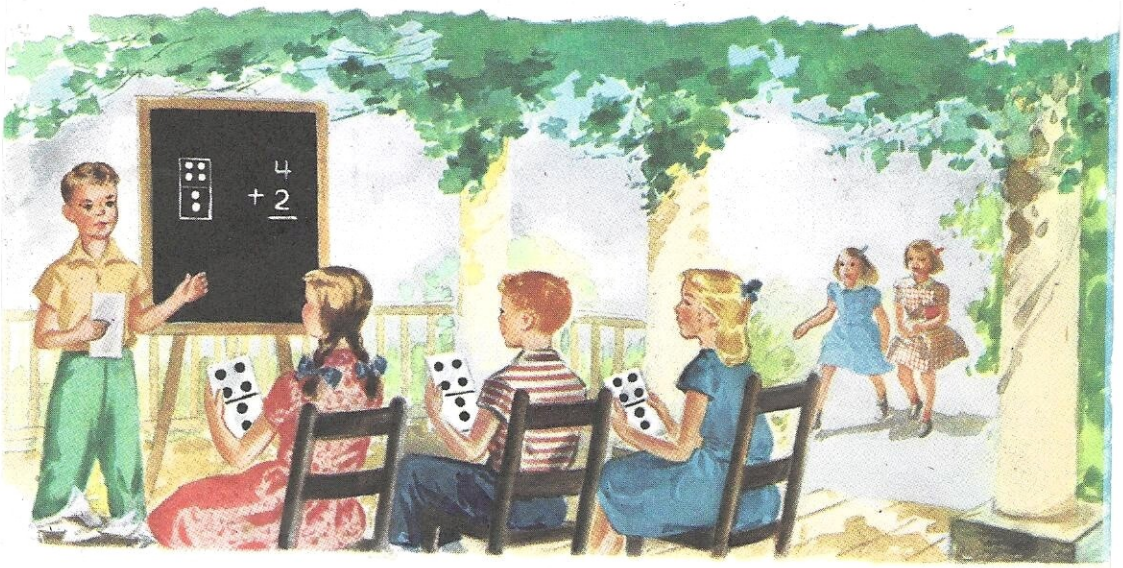
Some are there. Some more come to join. This is joining two smaller groups to make one larger group. We find the number in all by addition.

The number sign + means **and** or **plus.**

It tells you to add.

The sign = means **are as many as** or **equals.**

$3 + 2 = \blacksquare$ $2 + 3 = \blacksquare$ $2 + 2 = \blacksquare$



Some Ways to Show Adding

How many children are playing school? How many children are coming to play with them? Then how many children will be playing school?

A group of 2 children is joining a group of 4 children. This will make a larger group of 6 children.

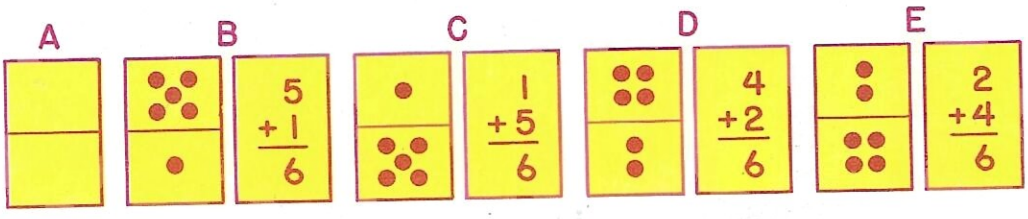
Use the ways below to show you are adding 4 and 2.

1. With children or objects in your room.
2. By drawing a picture to show the fact.
3. With a disk picture. Find a disk picture above.
4. With an addition fact:

$$\begin{array}{rl} 4 & \text{(children playing school)} \\ +2 & \text{(children who came)} \\ \hline 6 & \text{(children playing school)} \end{array}$$

5. Saying: 4 plus 2 is 6.
6. Writing a number sentence: $4 + 2 = 6$

In this lesson, there were **some** children. Other children **came to join** them. We added to find how many there were in all. The answer in adding is called the **sum.** The numbers we add are called **addends.**



Learn by Doing: How to Add

Cut a set of 6 paper disks or use disks like these:

Draw a line across the middle of a sheet of drawing paper, as you see in **A.**

Lay the set of 6 disks on the paper, as you see in **B.**

This shows that 5 plus 1 is 6. We write this:

5 addend
+1 addend
6 sum

We call $\begin{array}{r} 5 \\ +1 \\ \hline 6 \end{array}$ **a number fact.** The sign + means to **add.**

2. Turn the paper around. See how in **C.** This shows 1 plus 5 is 6. If the order of the numbers to be added is changed, is the answer changed?

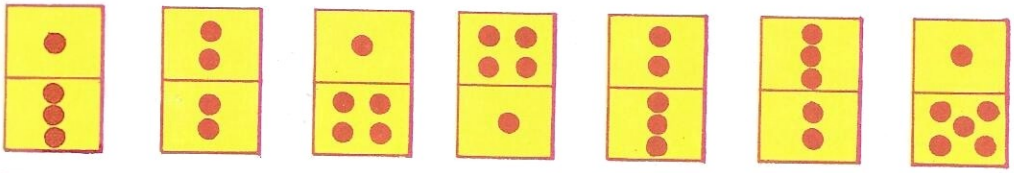
$\begin{array}{r} 1 \\ +5 \\ \hline 6 \end{array} \qquad \begin{array}{r} 5 \\ +1 \\ \hline 6 \end{array}$

Changing the order of the numbers to be added does not change the sum. This is the Law of Order for Addition.

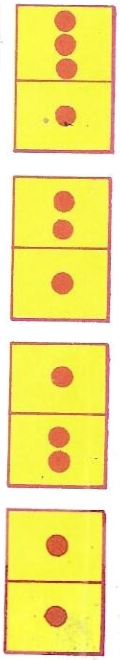
3. Lay the disks on the paper. See how in **D.** What number fact does the picture show?

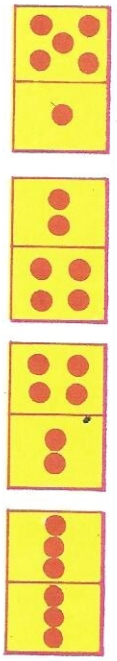
4. Turn the paper around as in **E.** What number fact does the picture now show? How do **D** and **E** show the Law of Order for Addition?

5. Show one more way to group the set of 6 disks.



Matching Addition Facts with Pictures





For each number fact below there is a disk picture. Find the disk picture that matches each fact.

1	1	2	3	1
+1	+2	+1	+1	+3
2	3	3	4	4
2	1	4	2	3
+2	+4	+1	+3	+2
4	5	5	5	5
1	5	2	4	3
+5	+1	+4	+2	+3
6	6	6	6	6

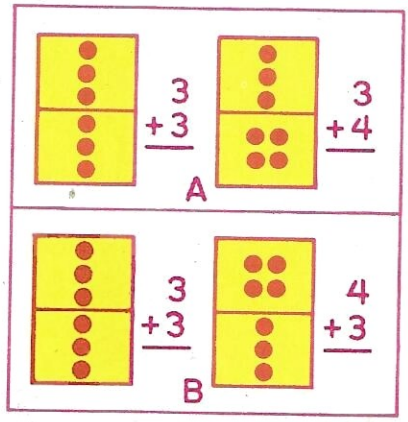
Copy each addition fact.
Beside it draw its disk picture.

The Doubles

$\begin{array}{r} 1 \\ +1 \\ \hline \end{array}$ $\begin{array}{r} 2 \\ +2 \\ \hline \end{array}$ $\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$ are called **doubles** because the numbers to be added are the same.

Susan says, "I know the sum of $\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$. This helps me to find the sum of $\begin{array}{r} 3 \\ +4 \\ \hline \end{array}$ and $\begin{array}{r} 4 \\ +3 \\ \hline \end{array}$. Each fact is **just one more** than $\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$."

Use pictures **A** and **B** to show Susan is right.



Adding with Ones

1. What do you see about the sum when 1 is added to another number?

4	2	5	1	3
+1	+1	+1	+1	+1
5	3	6	2	4

What is the sum of:
7 + 1? 9 + 1? 6 + 1?
8 + 1?

2. What do you see about the sum when another number is added to 1?

1	1	1	1	1
+4	+2	+5	+1	+3
5	3	6	2	4

What is the sum of:
1 + 6? 1 + 8? 1 + 7?
1 + 9?

Practicing Addition Facts

Say the sums. Copy the facts and write the answers.

1.	3	2	2	1	2	1	3	5
	+2	+1	+4	+1	+3	+2	+3	+1
2.	1	4	3	1	2	4	1	2
	+5	+2	+1	+4	+2	+1	+5	+4

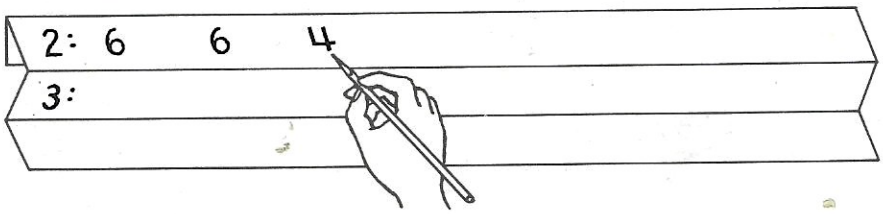
3. 3 + 2 = ■ 5 + 1 = ■ 3 + 3 = ■ 1 + 4 = ■

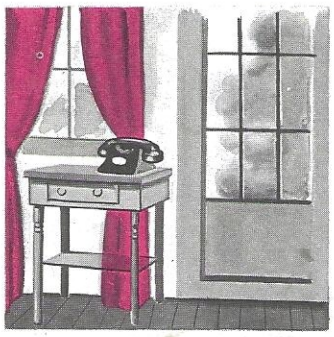
4. 2 + 3 = ■ 4 + 2 = ■ 1 + 3 = ■ 4 + 1 = ■

Another Way to Write Your Answers

Write only the answers on a sheet of paper laid under a row of number questions. After you write the answers for row 1, fold the answers under. Lay the folded edge under row 2. Begin row 2. Fold under each time you begin a new row.

	1	4	3	1	2	4	1	2
Row 2:	+5	+2	+1	+4	+2	+1	+5	+4





Frames and Number Sentences

1. What is a frame? A window frame holds the space for glass. What does a door frame hold? What does a picture frame hold?

2. **In arithmetic we can use frames to hold the place for a missing numeral.** Frames may have different shapes. Here are some frames you will use this year.

3. A frame is used in writing **number sentences.** This is a number sentence: **3 + 2 = 5.** To show a missing numeral in this number sentence, we use frames, like this:

4. Here are rules about using number frames:

   a. Some number sentences have two frames. If the frames are **the same shape** we replace them with **the same numeral.**

   b. When two frames in a number sentence are **not the same shape** we **may** replace them with **different numerals.**

What different pairs of numerals that name 6 can you write to replace the frames in problem b?

5. Make these number sentences true:

a.

b.

c.

d.

e.

f.

How to Study a Number Fact You Do Not Know

1. Study your practice card.

2. Show a picture of what the number fact means with circles or disks.

3. Say the fact and its answer to yourself.

4. Write the fact and its answer.

5. Write a number sentence for the fact.

6. Put the practice card back and test yourself again.

How Many in All?

1. Sally had 4 bird pictures. She painted 2 more bird pictures. How many bird pictures had she then?

2. Fred has 2 marbles in his hand. He has 3 marbles in his pocket. How many marbles has he in all?

3. Joe has 3 big turtles. He has 3 little turtles. How many turtles has he in all?

4. Sue had 4 jacks. She found 1 jack on the way to school. How many jacks did she have then?

5. Mary had 3 paper dolls. She cut out 2 more paper dolls. How many paper dolls did she have then?

Everybody Show: A Game That Is Fun

Make 10 cards like these and a card holder.

1. Lay the cards in two rows across your desk or table.

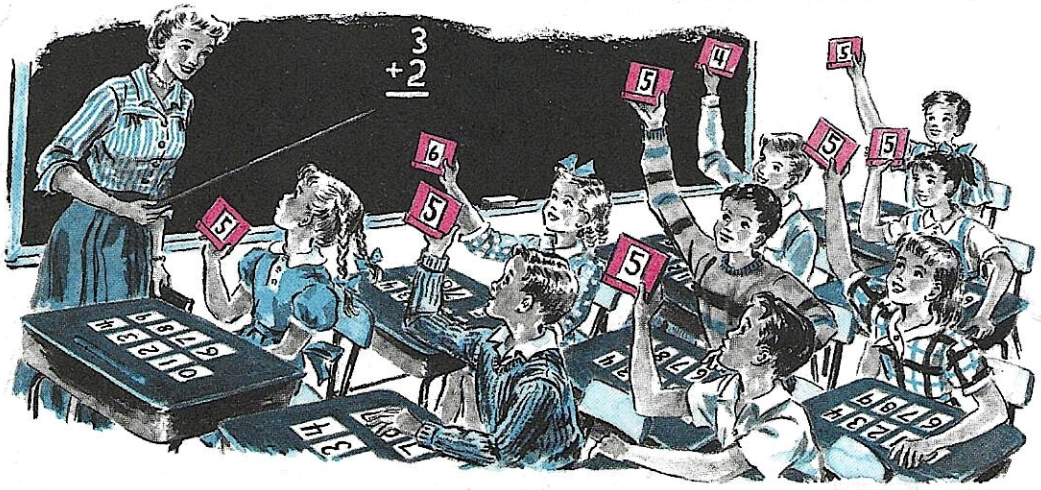
0	1	2	3	4
5	6	7	8	9

2. Your teacher will use the addition questions on page 8. She may write the number question on the board. Or she may hold up a card with a number question on it.

3. Think the sum. Look on your desk for the numeral that names the sum. Put the card in the card holder. When your teacher says UP hold it up so your teacher can see it.

4. Your teacher will then tell or show you the answer. Did you hold up a wrong answer? Then you should copy the number fact and the right answer on a paper. Make a disk picture for it later.

5. Do you know? READY, GO! Everybody SHOW! UP! Two children did not name the right sum. Find them.



Drawing Pictures Helps You to Understand Problems

1. Harry has 4 airplanes. Jack has 2 airplanes. How many airplanes have both boys together?

On your paper draw Harry's airplanes. Draw Jack's airplanes under Harry's airplanes. What question does the problem ask? Draw a ring around all the airplanes you drew. This joins the two groups.

How many airplanes do you see inside the ring?

Write a number sentence for this picture.

Write the number fact your picture shows. See how to label each part.

4 airplanes
+2 airplanes
6 airplanes

Draw a picture of each problem below. Beside the picture write a number sentence for the picture. Then write the number fact the picture shows. Label each part.

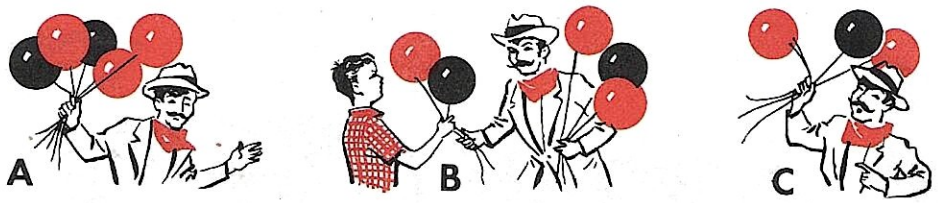
2. Joe had 2 boats. His brother gave him 4 boats. How many boats did he then have?

3. Sue had 4 dolls. Grandmother gave her 1 new doll. How many dolls did she then have?

4. Ned had 2 white rabbits and 3 black rabbits. How many rabbits had he altogether?

5. One day Tom caught 1 fish. His father caught 5 fish. How many fish did they both catch that day?

6. Three girls were jumping rope. Two more girls came to join them. How many girls were there then?



Taking Away Is Subtracting

1. In picture **A**, the man has how many balloons?

2. In **B**, how many balloons is he selling to Jim?

3. In **C**, how many balloons are left?

Subtract to find how many are left.

5 (balloons the man had)
−2 (balloons Jim bought)
3 (balloons that were left)

The sign **−** means to **take away.**

The answer in subtraction is called the **remainder.**

4. Which picture (top of page) shows the remainder?

5. Use these ways to show 5 − 2.

   a. With objects. Have 5 things. Take away 2 of them.

   b. With a picture. Cross out 2.

   c. With a disk picture.

   d. With a number sentence.

   5 − 2 = 3

6. Here are four ways to say 5 − 2 in the number sentence 5 − 2 = 3.

5 take away 2 **5 less 2** **5 minus 2** **2 from 5**

Read the number sentence 6 − 5 = 1 in these four ways.

How Many Are in the Other Group?

1. There are 6 monkeys in the trees. Two of the monkeys are big. The others are little. How many little monkeys are there?

6 (all the monkeys)
−2 (big monkeys)
▢ (little monkeys)

You know the sum of two numbers. You know one of the addends. You subtract to find the other addend.

2. In a game 6 children are hiding. Jack has found 4 children. How many children are still hiding?

3. Five children are at the playground. Two are on swings. The others are watching. How many children are watching?

4. Six children are at the merry-go-round. Three are boys. How many of the children are girls?

Matching Subtraction Facts with Pictures

For each number fact below there is a disk picture. Find the disk picture that matches each fact. Copy the number fact and the picture that matches it on your paper.

2	3	3	4	4	4	5	5
−1	−1	−2	−1	−3	−2	−1	−4
1	2	1	3	1	2	4	1

5	5	6	6	6	6	6
−2	−3	−1	−5	−2	−4	−3
3	2	5	1	4	2	3

On a sheet of paper lay disks to show each fact. Cover with your hand the disks to take away. Then say the fact.

Taking Away All There Are

Two apples are on a plate. Tony takes the 2 apples. These pictures show you

$$\begin{array}{r} 2 \\ -2. \\ \hline 0 \end{array}$$

Sometimes you subtract or take away all that you have. Then you must write zero as the remainder. This shows there is nothing left.

Why is the remainder 0 for each fact below?

1	3	5	4	6	9	8	7
−1	−3	−5	−4	−6	−9	−8	−7
0	0	0					

Using Ones in Subtraction

1. What do you see about **the remainder** when 1 is subtracted from a number?

4	6	2	5	3
−1	−1	−1	−1	−1
3	5	1	4	2

What is the remainder for 8 − 1? for 10 − 1? for 7 − 1? for 9 − 1?

2. What is **the remainder** when we subtract from a number the next smaller number?

4	6	2	5	3
−3	−5	−1	−4	−2
1	1	1	1	1

What is the remainder for 9 − 8? for 7 − 6? for 8 − 7? for 10 − 9?

Practicing Subtraction Facts

Copy the facts and write the remainders. Make a practice card for any fact you do not know or answer slowly.

6	5	5	6	5	6	4	6
−1	−2	−5	−5	−4	−3	−2	−3
6	4	5	2	6	3	5	6
−3	−4	−3	−2	−6	−2	−4	−2

4 − 1 = ▩	3 − 1 = ▩	2 − 1 = ▩	6 − 4 = ▩
4 − 3 = ▩	6 − 4 = ▩	3 − 3 = ▩	5 − 3 = ▩
5 − 1 = ▩	6 − 1 = ▩	6 − 5 = ▩	6 − 2 = ▩
5 − 5 = ▩	1 − 1 = ▩	5 − 2 = ▩	4 − 2 = ▩

1. Write the remainders on a folded paper.

2. Play the "Everybody Show" game (page 11). Your teacher will use the above number questions for the game.

Drawing Pictures to Show Taking Away

1. Tony had 6 marbles. He gave away 2 of them. How many marbles did he have left?

On your paper draw Tony's 6 marbles. This is how to show that Tony has given away 2 of the 6 marbles. Cross out 2 of the marbles.

How many marbles do you see are left? Write a number sentence for this picture.

Now write the number fact your picture shows. See how to label each part.

6 marbles
−2 marbles
4 marbles

Draw a picture of each problem below. Beside the picture write a number sentence for the picture. Then write the number fact the picture shows. Label each part.

2. Henry had 4 rabbits. He sold 1 of them. How many rabbits did he have left?

3. Ellen had 6 pennies. She spent 2 of them. How many of the 6 pennies did she have left?

4. Joe had 6 boats. He gave away 3 of them. How many boats did Joe have left?

5. Ruth threw out some crumbs. Five birds came. Then three of the birds flew away. How many birds were left?

6. Paul had 5 peanuts. He ate all of them. What should you write to show how many peanuts were left?

Comparing Two Numbers by Subtracting

1. Mary's dolls are in the top row. How many do you see there? Her sister Helen's dolls are in the bottom row. How many do you see there?

Cover with your hand as many dolls in the top row as you see in the bottom row. This shows how many more dolls there are at the top than at the bottom. How many more dolls does Mary have than Helen?

Susan said, "I cover 4 dolls in the top row. This takes away the number of dolls Helen has (4) from the number Mary has (5)."

5 (the number of dolls Mary has)
−4 (the number of dolls Helen has)
▒ (the number more that Mary has)

Subtract to find how much more one number is than another. This is a way of comparing two numbers.

2. How many more Indians are there in the green boat than there are in the red boat?

3. How many more clowns are there in red suits than there are clowns in blue suits?

Subtract to Find How Many More Are Needed

1. Each child is to use scissors. How many scissors should there be for this row of children?

"How many in the first row have scissors?" asked Miss Brown. How many children's hands are raised? Then how many scissors are there?

In the picture, cover the children whose hands are raised. How many children have no scissors? How many more scissors are needed?

5 scissors are wanted
−3 scissors are here
2 scissors are needed

2. Each child should have a chair. How many chairs should there be in all?

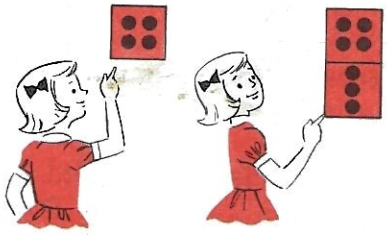
How many chairs are there? How many more chairs are needed? Write with numerals the story of this problem.

3. Daisy wants to paint all her paper dolls. How many dolls in all has she cut? How many dolls has she already painted? How many more dolls does she need to paint? Write with numerals what the picture shows.

This is how to find how many more are needed. Subtract the number you already have from the number you want in all.

Peggy and Tommy Show How Addition and Subtraction Are Related

Peggy said, "I can show you how addition and subtraction are related.



I begin with 4 disks.

I put 3 disks with 4 disks.

I have 7 disks in all.

$$\begin{array}{r} 4 \\ +\ 3 \\ \hline 7 \end{array}$$

addend
addend
sum

See the addition fact I have written. We call the 4 and the 3 addends. Addends are numbers to be added. 7 is the sum.

Now I am going to take apart what I just joined.

I begin with 7 disks in all.

This time I take the 3 disks away.

I have left the 4 disks I began with.

$$\begin{array}{r} 7 \\ -\ 3 \\ \hline 4 \end{array}$$

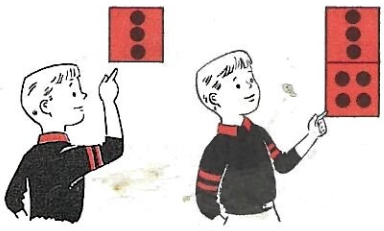
sum
addend
addend

See the subtraction fact I have written. We call the 7 the sum. It is the sum of 4 and 3. The 3 that I took away is an addend. The 4 shows the other addend.

Look carefully at the second picture in each row. In which row do I add a 3? In which row do I take away a 3?

In the bottom row of pictures I am doing the opposite of what I am doing in the top row. I showed you that subtraction is the opposite of addition."

Tommy said, "I can use the Law of Order for Addition to show another related addition fact.



$$\begin{array}{r} 3 \\ +\ 4 \\ \hline 7 \end{array}$$

addend
addend
sum

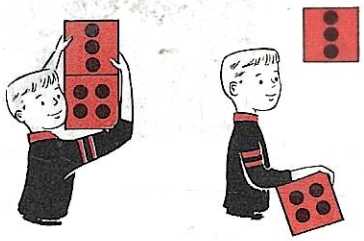
I begin with 3 disks.

I put 4 disks with 3 disks.

I have 7 disks in all.

See the addition fact I have written. Compare it with Peggy's addition fact on page 20. Did changing the order of the **addends** change the **sum**? Does $3 + 4 = 4 + 3$?

I can also show with my disks that subtraction is the **opposite** of addition.



$$\begin{array}{r} 7 \\ -\ 4 \\ \hline 3 \end{array}$$

sum
addend
addend

I begin with 7 disks in all.

This time I take the 4 disks away.

I have left the 3 disks I began with.

See the subtraction fact I have written. What do we call the 7? What do we call the 4? What do we call the 3?

In subtraction we know a **sum** and an **addend.** We subtract to find the other **addend.** Think:

Sum − addend = addend.

In addition we know two **addends.** We add to find a **sum.** Think: **Addend + addend = sum.**

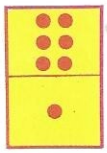
Number Families about Seven

On pages 20 and 21 Peggy and Tommy showed you four related number facts about a group of 4 and a group of 3. What were these four related facts? Write them on your paper.

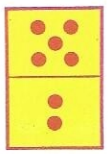
For each picture of 7 disks below do two things:

1. Tell how the 7 disks are grouped in the picture.

2. Point to or cover the groups of disks as you say each of the related number facts below the picture.

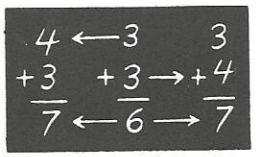
A 

6	1	7	7
+1	+6	−1	−6
7	7	6	1

B 

5	2	7	7
+2	+5	−2	−5
7	7	5	2

3. How will knowing 3 + 3 = 6 help you to find the sum of 3 + 4? the sum of 4 + 3?



4. Write the answers on a folded paper.

4	7	3	7	6	7	1	7
+3	−3	+4	−4	+1	−1	+6	−6
5	7	2	7	7	6	5	4
+2	−2	+5	−5	−7	−6	−5	−4

5. Name the missing numerals that make each number sentence below a true sentence.

a. 6 + 1 = ☐
b. 6 + ☐ = 7
c. ☐ + 1 = 7
d. 1 + 6 = ☐
e. 5 + 2 = ☐
f. ☐ + 5 = 7
g. 2 + 5 = ☐
h. 5 + ☐ = 7
i. 4 + 3 = ☐
j. 4 + ☐ = 7
k. ☐ + 3 = 7
l. 3 + 4 = ☐

Drawing Pictures to Show Separating

1. Mother Hen has 7 chicks. Five of these chicks are black. The others are yellow. How many chicks are yellow?

To find the number of yellow chicks, draw pictures of the 7 chicks. How many of the 7 chicks are black? Color only the black chicks on your paper. Now draw a mark between the black chicks and the other chicks. See how below.

How many chicks in your picture are not colored? Color these yellow. How many yellow chicks does your picture show?

Susan said, "I drew a mark between the black chicks and the other chicks. This showed that I was taking away 5 chicks from 7 chicks. This showed that 2 chicks should be yellow."

Write a number sentence for this picture.

7 chicks
−5 chicks
2 chicks

Now write the number fact your picture shows. See how to label each part.

Draw a picture of each problem below. Beside the picture write a number sentence for the picture. Then write the number fact the picture shows. Label each part.

2. Tom has read 7 books. Four were about trains. The others were about boats. How many books were about boats?

3. Seven cookies are on a plate. Two of them are brown. The others are white. How many cookies are white?

A $5 + 2 = 7$ (addend, addend, sum)

B $7 - 2 = 5$ (sum, addend, addend)

Let's Study Some Number Sentences

1. Use the two number sentences in **A** and **B** above to show that in both addition and subtraction we use addends and a sum.

2. In addition we begin with one addend. We put another addend with it. We get a sum. Which number sentence above shows this, **A** or **B**?

3. Subtraction takes apart what we join in addition. We begin with the sum of two addends. We take away one of the addends. What is left is the other addend. Which number sentence above shows this, **A** or **B**?

4. Below are some number sentences for us to finish. We must replace the frames with a numeral that will make the number sentences true.

   a. Mike thinks, "I see two addends, so the sum is missing. 4 plus 2 is 6." What should Mike write on his paper?

$4 + 2 = \square$ $\quad 2 + 4 = \square$ $\quad \square - 4 = 2$ $\quad \square - 2 = 4$

   b. Ann thinks, "I see the sum and one of the addends. So the other addend is missing. 6 minus 2 is 4." What should Ann write on her paper?

$6 - 2 = \square$ $\quad 6 - \square = 2$ $\quad \square + 2 = 6$ $\quad 2 + \square = 6$

5. Now see if you can make these number sentences true.

$7 - 5 = \square$	$2 + 5 = \square$	$7 - 1 = \square$	$6 + 1 = \square$
$7 - \square = 2$	$5 + 2 = \square$	$7 - \square = 1$	$1 + 6 = \square$
$5 - 3 = \square$	$2 + 3 = \square$	$5 - 1 = \square$	$4 + 1 = \square$
$5 - \square = 2$	$3 + 2 = \square$	$5 - \square = 1$	$1 + 4 = \square$

Writing Number Sentences for Problems

1. On a plate Mother put 4 white cookies and 3 brown cookies. How many cookies in all are on the plate?
Think: I know the number of white cookies is 4.
I know the number of brown cookies is 3.
I do not know the number of cookies in all.

Write on your paper: 4 ○ 3 = **n**.

The ○ holds a place for + or −. You must find out if you are to add or to subtract. The **n** holds the place for the missing numeral you do not know.

Tony looked at the problem again. He thought, "The **n** holds a place for a sum." Should Tony decide to add or subtract? What should he replace the ○ with in his number sentence? What should he replace the **n** with in his number sentence?

2. Mother put 7 cookies on a plate. The children ate 3 of the cookies. How many cookies were left?
Think: I know the number of cookies in all is 7.
I know the number of cookies the children ate is 3.
I do not know the number of cookies that are left.

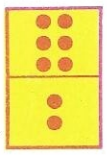
Write on your paper: 7 ○ 3 = **n**.

What does the ○ mean? What does the **n** mean?

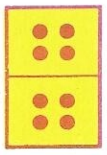
Sally looked at the problem again. She thought, "I know the **sum** is 7. I know a group of 3 has been taken away. This 3 is an **addend.** The **n** holds a place for the other **addend.**"

Should Sally decide to add or subtract? What should she replace the ○ with in her number sentence? What should she replace the **n** with in her number sentence?

3. Write a number sentence for this problem: Jack has 5 toy cars. Tom has 2 cars. How many cars in all have they?

A 

$6 + 2 = ?$ $\quad 2 + 6 = ?$ $\quad 8 - 2 = ?$ $\quad 8 - 6 = ?$

B 

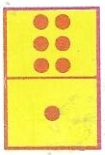
$4 + 4 = ?$ $\quad 8 - 4 = ?$

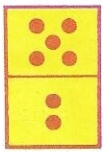
Writing Number Families about Pictures

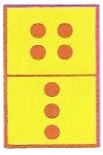
1. On paper copy disk picture A. Beside your picture write the four related number facts and their answers.

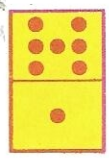
2. Why are there only two related number facts for picture B? Copy the disk picture. Beside it write the two related number facts.

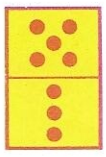
3. Copy each disk picture below. Beside each picture write the four related number facts you can show with the picture.

C 

D 

E 

F 

G 

Working with Eights

1. Name the missing number in each number sentence.

a	b	c	d
$6 + 2 = \square$	$2 + 6 = \square$	$5 + 3 = \square$	$3 + 5 = \square$
$6 + \square = 8$	$2 + \square = 8$	$5 + \square = 8$	$3 + \square = 8$
$8 - 2 = \square$	$8 - 6 = \square$	$8 - 3 = \square$	$8 - 5 = \square$
$8 - \square = 6$	$8 - \square = 2$	$8 - \square = 5$	$8 - \square = 3$
$\square - 6 = 2$	$\square - 2 = 6$	$\square - 5 = 3$	$\square - 3 = 5$

2. $\begin{array}{r} 8 \\ -8 \\ \hline 0 \end{array}$ Make up a problem about this number fact. Then write the number sentence.

3. Use the Law of Order to name the missing numbers.

a. $6 + 2 = \square + \triangle$ b. $5 + 3 = \square + \triangle$ c. $7 + 1 = \square + \triangle$

Ted Has a Birthday

Write a number sentence for each problem. Solve the number sentence. Label each answer correctly.

1. Ted invited 3 boys and 4 girls to his birthday party. How many children in all did he invite?

2. Why were eight dishes filled? Mother has put cherries on 3 dishes of ice cream. How many dishes are left to fix?

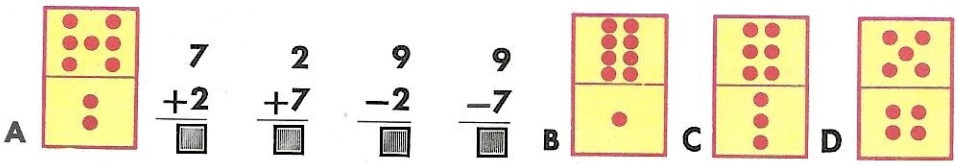
3. Eight children are playing at the party. Only 5 are wearing their hats. How many children are without hats?

4. Ted is 8 years old today. Are there 8 candles on his cake? Ted tried to blow out all the candles at once. How many are still lit? How many candles did Ted blow out the first time? Why do you think Ted invited 7 children?

5. Each of the 8 children had a balloon. Only 5 balloons are left. The others burst. How many balloons burst?

6. Name the missing number in each number sentence below. Then make a problem about a birthday party for each number sentence. Work your problem. Label each part.

a. $4 + 4 = \square$ b. $8 - 7 = \square$ c. $3 + 5 = \square$



Writing Number Families about Pictures

1. There are four related facts for Picture A above. On paper copy the disk picture. Beside the picture you draw, write the four related number facts and their answers.

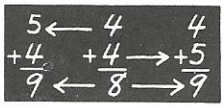
2. Copy each disk picture above. Beside each write the four related number facts you can show with the picture.

Working with Nines

1. Name the missing number in each number sentence below.

a	b	c	d
$7 + 2 = \square$	$2 + 7 = \square$	$6 + 3 = \square$	$3 + 6 = \square$
$7 + \square = 9$	$2 + \square = 9$	$6 + \square = 9$	$3 + \square = 9$
$9 - 2 = \square$	$9 - 7 = \square$	$9 - 3 = \square$	$9 - 6 = \square$
$9 - \square = 7$	$9 - \square = 2$	$9 - \square = 6$	$9 - \square = 3$
$\square - 7 = 2$	$\square - 2 = 7$	$\square - 6 = 3$	$\square - 3 = 6$

2. How will knowing $4 + 4 = 8$ help you to remember the sum of $5 + 4$? the sum of $4 + 5$?



3. Write a number sentence for this problem.

There were 9 books on the library table. Mary took 2 of the books to her desk. How many books were left on the table?

On your paper write $9 \bigcirc 2 = n$. For what does the $\bigcirc$ hold a place? the n?

In the problem is the 9 an addend or a sum? Is the 2 an addend or a sum? Should you add or should you subtract?

Write the correct number sentence on your paper.

The Law of Grouping for Addition

1. Read this number sentence: $4 + 5 = 9$.

2. There are other number names for the 4 in problem 1. Here are some addition number names for 4:

$3 + 1$ $\quad$ $2 + 2$ $\quad$ $1 + 3$ $\quad$ $4 + 0$ $\quad$ $0 + 4$

3. We can write the number sentence in problem 1 in many ways. We can use any of the other number names for 4. We will put the other number name inside of marks like these: ( ). These marks are called **parentheses.** See how parentheses are used below.

a. $(3 + 1) + 5 = 9$ $\quad$ b. $(2 + 2) + 5 = 9$

When we work with number sentences like a and b above we do the work inside the parentheses first. In a, first find $3 + 1$ because it is inside the parentheses. Then take the sum, 4, and add it to the other number. What do you do first in b?

4. Now see what happens if we move the ( ) marks and group the addends in a different way.

a. $(3+1) + 5 = 4 + 5 =$ ▣
$3 + (1+5) = 3 + 6 =$ ▣

b. $(2+2) + 5 = 4 + 5 =$ ▣
$2 + (2+5) = 2 + 7 =$ ▣

5. Did changing the way we grouped the addends in each number sentence in problem 4 change the sum?

We can change the way we group the addends in an addition example. This will not change the sum. We call this the Law of Grouping for Addition.

6. Do you understand the Law of Grouping? Group the addends in each of the examples below in a new way. See if the sum is the same when you change the grouping.

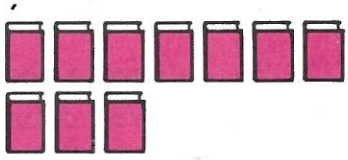
a. $(1 + 3) + 5 =$ ▣ $\quad$ b. $(3 + 4) + 2 =$ ▣

Drawing Pictures to Compare Numbers in Problems

How many **more than** one number is the other number?

1. Bob has read 7 books. Ann has read 3 books. How many more books has Bob read than Ann?

On your paper draw the 7 books Bob has read. Then draw the books Ann has read below Bob's books. See how at the right.



Now find out how many more books Bob has read than Ann.

Ann read **fewer** books. Draw a mark through all of Ann's books. Next, draw a mark through as many of Bob's books as Ann's books.

Look to see how many more books Bob has read than Ann has read. Write a number sentence.

Now write the number fact your picture shows. See how to label each part.

7 books
−3 books
4 books

How many more books has Bob read?

Draw a picture for each problem below. Beside the picture write a number sentence. Then write the number fact the picture shows. Label each part.

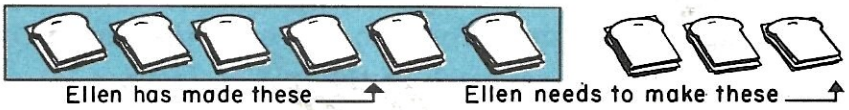
2. Mary has 9 dolls. Her sister, Helen, has 5 dolls. How many more dolls has Mary than Helen?

3. Don earned 9 pennies. His brother, Tom, earned 4 pennies. How many more pennies did Don earn than Tom?

Showing How Many More Are Needed

1. Ellen is to make 9 sandwiches for the school Halloween party. She has made 6 sandwiches. How many more sandwiches does she need to make?

Let's draw a picture for this problem. First, draw the 9 sandwiches that Ellen is to make. She already has made 6 sandwiches. Then put a box around 6 sandwiches.



To find how many more are needed, name the number you want in all. Subtract from it the other number you already know. Write a number sentence for this problem.

Now write the number fact your picture shows. See how to label each part.

9 sandwiches
−6 sandwiches
3 sandwiches

Also, you could think, what added to 6 will make 9?

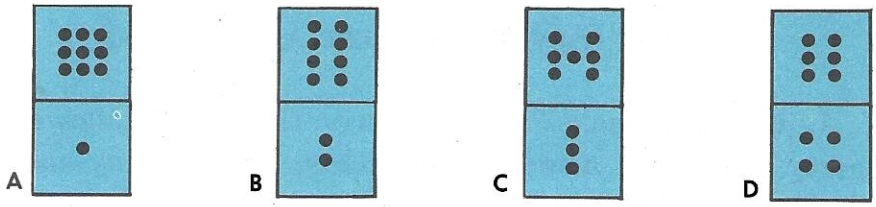
Write a number sentence for this.

Draw a picture for each problem below. Beside the picture write a number sentence. Then write the number fact the picture shows. Label each part.

2. The children want 9 jack-o'-lanterns for the party. They have made 4 jack-o'-lanterns. How many more jack-o'-lanterns do they need to make?

3 "We need 9 candles for our jack-o'-lanterns," said Joe. The children have only 3 candles. How many more candles do they need?

4. Jim wants to put 9 black cats in the windows. He has put up 7 black cats. How many more black cats does he need to put up?



Number Families about Ten

1. For each disk picture above, do two things:
   a. Tell how the 10 disks are grouped.
   b. Match the related number facts below with the correct picture. Point to or cover the groups of disks as you say each of the related facts.

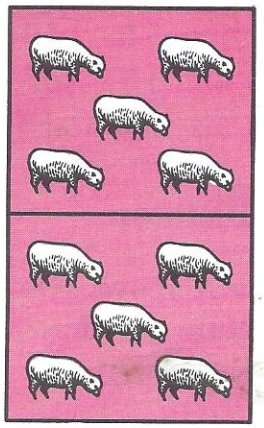
A	9	1	10	10	B	8	2	10	10
	+1	+9	−1	−9		+2	+8	−2	−8
	10	■	■	■		10	■	■	■
C	7	3	10	10	D	6	4	10	10
	+3	+7	−3	−7		+4	+6	−4	−6
	10	■	■	■		10	■	■	■

2. In each group of related number facts above, find the pair of number facts which show the Law of Order for Addition. Copy each pair on your paper.

3. Show that in each subtraction fact you begin with the **sum of the related addition fact.** You take away one of the **addends.** The remainder is the **other addend.**

4. Show how the Law of Grouping for Addition gives the same sum that you get in the groups of number facts above.

a. $1 + 9 = 1 + (8+1) =$ ■ $(1+8) + 1 = 9 + 1 =$ ■	b. $2 + 8 = 2 + (6+2) =$ ■ $(2+6) + 2 = 8 + 2 =$ ■
c. $3 + 7 = 3 + (4+3) =$ ■ $(3+4) + 3 = 7 + 3 =$ ■	d. $4 + 6 = 4 + (2+4) =$ ■ $(4+2) + 4 = 6 + 4 =$ ■



E

Working with Tens

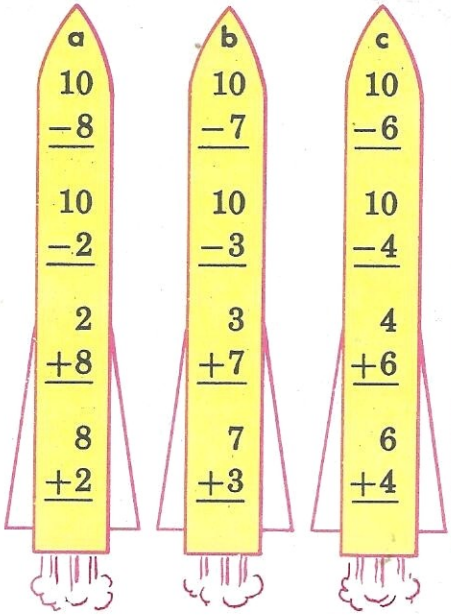
1. How are the 10 sheep grouped in E?

2. Why does this picture show a double? You can show two related number facts with this picture. Point to or cover the groups of sheep as you say $\begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array}$ and $\begin{array}{r} 10 \\ -5. \\ \hline \square \end{array}$

3. What discoveries can you make about the two addends for each number fact below?

1	2	3	4	5	6	7	8	9
+9	+8	+7	+6	+5	+□	+□	+□	+□
10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10
−9	−8	−7	−6	−5	−4	−3	−2	−1
1	2	3	4	5	□	□	□	□

4. Name the missing numbers. To make each rocket go up begin at the bottom.



5. Name the missing number in each number sentence below.

a

$9 + 1 = \square$
$9 + \square = 10$
$10 - 1 = \square$
$10 - \square = 9$
$\square - 9 = 1$

b

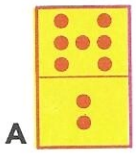
$1 + 9 = \square$
$1 + \square = 10$
$10 - 9 = \square$
$10 - \square = 1$
$\square - 1 = 9$

c

$5 + 5 = \square$
$10 - \square = 5$

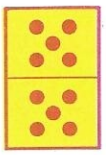
d

$\square + 5 = 10$
$\square - 5 = 5$



A

$$\begin{array}{cccc} 7 & 2 & 9 & 9 \\ +2 & +7 & -2 & -7 \\ \hline \square & \square & \square & \square \end{array}$$



B

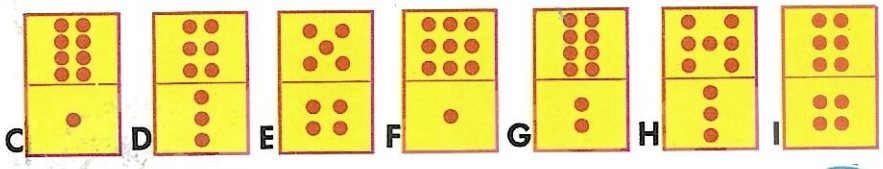
$$\begin{array}{cc} 5 & 10 \\ +5 & -5 \\ \hline \square & \square \end{array}$$

Writing Number Families about Pictures

1. There are four related facts for Picture A above. On paper copy the disk picture. Beside the picture you draw, write the four related number facts and their answers.

2. Why are there only two related number facts for Picture B? Copy the disk picture. Beside it write the two related number facts and their answers.

3. Copy each disk picture below. Beside each write the four related number facts you can show with the picture.



C D E F G H I

Practicing Number Facts

Write the answers on a folded paper. Make practice cards for facts you do not know or are slow in answering.

$$\begin{array}{ccccccccc} 7 & 5 & 9 & 10 & 3 & 8 & 10 & 9 & 9 \\ +2 & +5 & -2 & -3 & +6 & +1 & -9 & -4 & -9 \end{array}$$

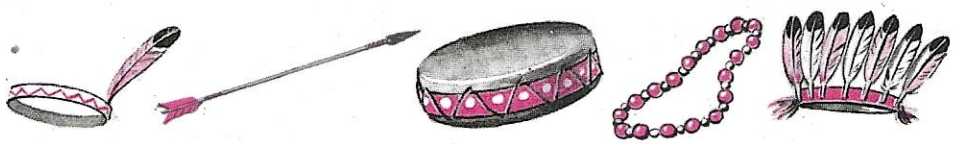
$6 + 4 = \square$ $\quad 9 - 6 = \square$ $\quad 1 + 9 = \square$ $\quad 10 - 1 = \square$

$2 + 7 = \square$ $\quad 10 - 8 = \square$ $\quad 2 + 8 = \square$ $\quad 9 - 8 = \square$

$$\begin{array}{ccccccccc} 5 & 3 & 9 & 10 & 4 & 1 & 10 & 9 & 10 \\ +4 & +7 & -7 & -6 & +6 & +8 & -4 & -5 & -2 \end{array}$$

$8 + 2 = \square$ $\quad 7 + 3 = \square$ $\quad 6 + 3 = \square$ $\quad 10 - 5 = \square$

$9 + 1 = \square$ $\quad 10 - 7 = \square$ $\quad 4 + 5 = \square$ $\quad 8 - 8 = \square$



Drawing Pictures about an Indian Play

For each problem: (a) Draw a picture. (b) Write a number sentence. (c) Label the answer. (d) Turn to the pages in parentheses ( ) if you need help.

1. Three girls and 7 boys are painting an Indian picture. How many children are painting? (page 12)

2. Andy has made 5 Indian headbands. Harry has made 4. How many headbands have the two boys made? (page 12)

3. Andy wants to make 9 headbands in all. He has made 5. How many more must he make? (page 31)

4. Harry had 10 feathers. He used 7 for the chief's headband. How many feathers are left? (page 17)

5. Some girls are making strings of Indian beads. Nine red strings and 6 yellow strings are finished. How many more red than yellow strings have the girls made? (page 30)

6. Peter has made 6 arrows. Jim has made 4 arrows. How many arrows in all is this? (page 12)

7. Joe brought a tom-tom. The boys made 9 more. How many tom-toms have they now in all? (page 12)

8. Nine children will do an Indian dance. Two of the dancers are dressed as chiefs. The others are dressed as braves. How many Indian braves are in the dance? (page 23)

9. The children need 9 long sticks to set up the wigwam. They have only 7 sticks. How many more sticks do they need to get? (page 31)

10. Four girls and 6 boys have finished their Indian suits. How many children have finished their suits? (page 12)

How Many or Which One?

1. In the art class the children drew pictures of ways children like to play. How many pictures do you see?

2. Peggy placed the pictures in rows. How many rows do you see?

3. Some numerals tell **how many.** Other numerals tell **which one.** Peggy is pointing to her picture. In which row is it? We can say it is the **first** picture in the **third** row. The words **first** and **third** tell us which one.

4. Use numerals to tell which picture shows:
   a boy playing football; a boy playing Indian;
   a girl roller skating; a girl riding a bicycle.

5. Choose some other picture above. Tell where it is. Choose someone to tell you what the picture shows.

6. Your teacher will write ten ways the children in your class say they like to play. Which of the ways on this list is sixth? seventh? eighth? ninth? tenth?

Adding Three Numbers

Roy and Doris are playing Roy's new game. Each one rolls the ball three times. A miss counts 0. Roy is adding his score. He placed the three numerals in a column.

2

2
1
5
8

Begin at the top. See 1. Think 3.
Think three and see 5. Think: 3 + 5 = 8. Write 8.
How many numbers did you add at a time?
Show how you used the Law of Grouping.
To check his score, Roy began at the bottom.

1

See 5 at the right. Think six and add 2.
How many numbers did you add at a time?
Is the sum 8 both times? Does the score check?

2
1
5
8

Show how you used the Law of Order and the Law of Grouping to check the above example.

1. Find the scores below. Who won each game?

Game 1		Game 2		Game 3		Game 4	
Roy	Doris	Roy	Doris	Roy	Doris	Roy	Doris
2	3	5	3	4	5	5	3
1	4	1	2	4	0	2	5
5	0	2	5	2	4	3	2

2. How many tries did Doris have in Game 1? Which try did she miss? Why must she write the zero in her score?

3. Did either child win the last game? Tell why.

322 Helps for Adding Three Numbers

1. Think **one**. Add each number named below to the **one** you are thinking.

5 1 7 4 6 3 8 0 2 9

2. To **two** add each of the numbers named but 9.

3. To **three** add each of the numbers named but 8 and 9.

Let's Add. Check each answer. How do you use the Law of Grouping for Addition in these examples?

1	4	4	8	0	2	1	0
4	0	3	1	3	2	5	0
5	5	2	1	6	6	4	8

Which two examples above have the same addends but in a different order? What is true of their sums?

The numeral inside the colored circle on the left side of the title on this page and other pages to follow tells where to find more practice in the workshop.

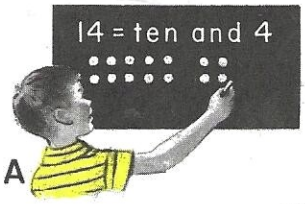
A Meaning of Zero

Lee and Bill are playing a game. Each boy has 4 throws. Each time the ring falls over the stick it counts 1. A miss counts nothing. This means not any. To show **nothing** or **not any** we write **0**. How many times has Lee missed?

Lee may ring the stick on the last try. What will his score for the 4 throws be? What will his score be if he misses?

0	0	0	?

Lee's Score



Play a Game with Words

Here are three ways to show what the **words** mean.

1. Write or draw something on the blackboard. See **A.**

2. Act out what the word means. See **B.**

3. Tell what the word means. See **C.**

Choose two teams. The teams will take turns. Each child must show that he knows what his words mean. He must use one of the above three ways.

If you show the meaning of the words, you win a point for your team. READY, GO! Which team will win?

Team 1

1. addend
2. afternoon
3. a double
4. count
5. eight
6. equals
7. 5 less 2
8. fifth
9. frames
10. Law of Order for Addition
11. more than
12. most
13. ninth
14. number
15. numeral
16. older
17. + sign
18. related numbers
19. remainder
20. subtraction
21. take away
22. zero

Team 2

1. addition fact
2. as many as
3. Law of Grouping for Addition
4. eighth
5. fewer than
6. group
7. less than
8. minus
9. − sign
10. morning
11. next
12. nothing
13. number family
14. number sentence
15. plus
16. set of disks
17. sum
18. tenth
19. third
20. three
21. 2 from 5
22. younger

Practicing Addition

Write the answers on a folded paper. Study with practice cards any facts you do not know or are slow in answering.

5	8	3	7	5	0	5	6	1
+5	+2	+5	+0	+2	+8	+4	+4	+9
1	3	4	2	8	7	2	5	3
+7	+7	+6	+6	+1	+3	+7	+3	+4

4 + 3 = ▢	6 + 3 = ▢	3 + 7 = ▢	9 + 0 = ▢
6 + 2 = ▢	4 + 5 = ▢	4 + 4 = ▢	3 + 6 = ▢
5 + 0 = ▢	7 + 2 = ▢	4 + 6 = ▢	2 + 8 = ▢

Practicing Subtraction

8	7	6	8	9	10	8	9	10
−1	−6	−4	−8	−5	−8	−2	−1	−2
10	9	8	7	10	9	6	10	9
−4	−2	−3	−7	−3	−7	−5	−7	−4
9	8	10	8	7	10	7	10	9
−6	−6	−1	−4	−3	−9	−5	−5	−9

9 − 3 = ▢	6 − 3 = ▢	8 − 7 = ▢	8 − 5 = ▢
7 − 7 = ▢	7 − 2 = ▢	10 − 7 = ▢	9 − 8 = ▢
7 − 4 = ▢	10 − 8 = ▢	10 − 3 = ▢	10 − 6 = ▢

Writing Number Sentences

1. Write 11 different addition number sentences whose sums are 10.

2. Write 10 different subtraction number sentences in which you subtract a number from 10.

Checking Up on Understandings

(Work to do alone at your seat)

1. "Guess how many marbles I have in my hands," said Joe. Ann guessed 12. Ted guessed 15. Sam guessed 13. Alice guessed 18. Jerry guessed 7.

"No one is right," said Joe. "See, I have 10." Which child guessed nearest to the right number?

2. Below are some problems. Read each problem. Below it are three number sentences. Only one of these three number sentences is a true number sentence for that problem. For each problem find the true number sentence.

Jerry read one story that was 6 pages long. He read another story that was 4 pages long. How many pages did he read in all?

a. $6 + 6 = \square$ b. $10 - 6 = \square$ c. $6 + 4 = \square$

Sue had a box of 10 candy eggs. She ate 4 candy eggs. How many candy eggs are left?

a. $6 + 4 = \square$ b. $10 - 6 = \square$ c. $10 - 4 = \square$

3. Write your first and last name on paper. Put a ring around the second letter in your first name. Put a cross over the third letter in your last name.

4. Write all the number sentences you can which name the sums or remainders for each group below. The numeral in ( ) tells you how many number sentences to write in each group.

a. sums of 7 (8)
b. sums of 8 (9)
c. sums of 9 (10)
d. sums of 10 (11)
e. remainders of 1 (9)
f. remainders of 2 (8)
g. remainders of 3 (7)
h. remainders of 4 (6)

5. Write 9 number facts which have a remainder of 0.

Chapter 2

A Science Corner

For each problem: (1) Draw a picture. (2) Write a number sentence. (3) Solve the number sentence. (4) Label your answer.

1. The children made 6 posters. There is room to put up only 4 posters. How many posters cannot be put up?

2. Arthur brought his butterflies. How many has he placed in the top row? How many in the bottom row? How many butterflies are there? How many are 2 fours?

3. Tony wants to have 8 cocoons. He has 6 cocoons in the can he is holding. How many more does he need?

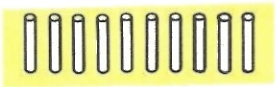
4. Dorothy put 10 tadpoles in the glass jar she is holding. Eight tadpoles are small. The others are big. How many big tadpoles did she put in the jar?

5. How many leaves is Ted showing? Ted brought 6 of these leaves. Paul brought the rest. How many leaves did Paul bring?

6. Ann brought shells. How many is she holding? How many are on the table? How many shells did she bring?

7. Jim found 5 science books. Alice found 6. How many more books did Alice find than Jim found?

8. How many more leaves are shown than birds?



Count the pegs.

Call them 10 ones.

10 ones = 1 bundle.

Call the bundle 1 ten.

Eleven to Twenty: What Do We Mean?

After 10 comes the number 11. Eleven means 1 ten and 1 one more. The first picture below tells about 11. Read what the other numbers mean. Read each number name.

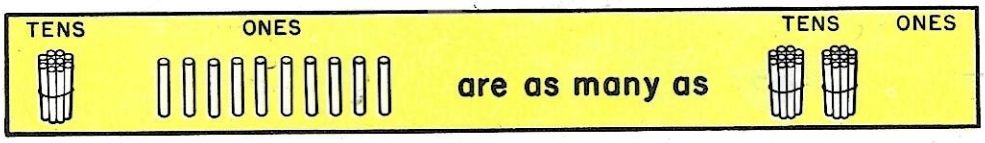
11 means and		eleven
12 means and		twelve
13 means and		thirteen
14 means and		fourteen

1. How would you picture with pegs what 15 (fifteen) means? 16 (sixteen)? 17 (seventeen)? 18 (eighteen)? 19 (nineteen)?

2. Read the numerals below and tell what each means. Write the numerals as your teacher reads them.

15 12 14 16 13 18 17 11 19

3. Look below to find the picture of 1 ten and 10 ones. The 10 ones make another bundle of ten. Find the picture that shows 2 bundles of ten. These 2 tens are called 20 (twenty). In 20, what does the 2 tell us? What does the 0 tell us?



Ways to Count

1. We are playing "hide-and-seek." Dan is counting to 100 by fives. Read the numerals in the picture. Find and read these same numerals in the chart below.

2. Use this chart to read by ones from 1 to 100. Which is faster: to count to 100 by 1's or by 5's as Dan counted?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

3. Read the numerals on the right in the above chart from top to bottom. Start with 10. This is counting by 10's.

4. Counting by twos is counting two at a time. On this chart begin with 2. Skip its neighbor 3. Say 4. Skip its neighbor 5. Say 6. In this way keep on counting by twos from 2 to 50. Then count by twos from 52 to 100.

5. What is the smallest number named in the above chart? What is the largest number named?

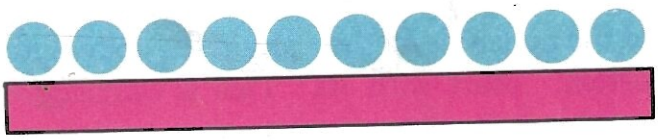
6. Tommy says, "Counting or reading any of the 'up and down' rows in the chart is counting by tens." Show that Tommy is right.

A	1	2	3	4	5	6	7	8	9	10
B	11	12	13	14	15	16	17	18	19	20
C	21	22	23	24	25	26	27	28	29	30
D	31	32	33	34	35	36	37	38	39	40
E	41	42	43	44	45	46	47	48	49	50
F	51	52	53	54	55	56	57	58	59	60
G	61	62	63	64	65	66	67	68	69	70
H	71	72	73	74	75	76	77	78	79	80
I	81	82	83	84	85	86	87	88	89	90
J	91	92	93	94	95	96	97	98	99	100

What the Numerals to 100 Mean

A Hundred Chart

You can show the meaning of numerals from 1 to 100 with two strips of colored paper and the chart above. Each strip should be just as long as a row of disks, like this:

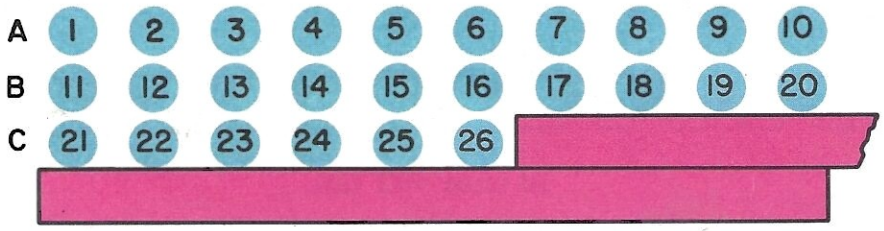


1. How many disks are there in row A from left to right? Are there 10 disks in each of the rows?

2. Count the number of rows of disks. How many rows?

3. Lay a strip under the first row. Move it down as you count the disks in the chart by 10's. How many disks are there in all 10 rows? Find the disk which has the numeral on it which shows your answer is correct.

4. Each disk shows one. How many **ones** in all are there in 100? How many **tens** are there in 100?



Working with the Hundred Chart

1. How many disks are in row A above?

2. How many whole rows of 10 disks do you see?

3. How many disks are in these two rows of 10 disks?

4. How many disks are shown in row C? See how two strips of paper are used to show only 6 disks in row C.

5. How many disks in all are uncovered above?

6. Use the picture to show that 26 is 2 tens and 6 ones. With your two strips of paper show 26 on the hundred chart on page 46. Show 38, 18, 57, 79, 63, 94, 85 and 30.

We see from the chart that 38 = 30 + 8. What is another way to write 18? Write each numeral above in this form.

Each digit has its place in a numeral. **The place shows what the digit means.** In the numeral 26, the 2 is in tens' place. The 2 means 2 tens. Each disk shows **one.** 6 disks show 6 **ones.** The 6 is in ones' place and means 6 ones.

7. The numerals from 10 to 99 are **two-place** numerals. They have digits in tens' place and ones' place. Name the digit in tens' place and in ones' place in each numeral below. Tell what each numeral means.

13 20 35 47 50 69 74 82 91

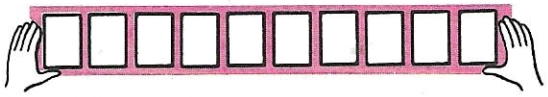
8. Use the hundred chart on page 46. With your two colored strips, show what the above numerals mean.

9. What does 0 in ones' place in 20 tell us?

10 ones = 1 ten

Place Value

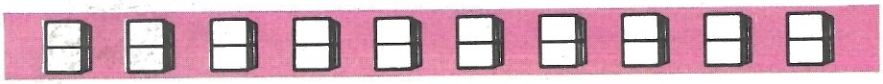
1. Above, you see 10 small cards. Each card stands for **one.** Frame the 10 ones with your hands like this:



2. We can put 10 cards together. They will look like the bundle you see above at the right. Point to it. Call this bundle 1 **ten.** Why is it 1 ten?

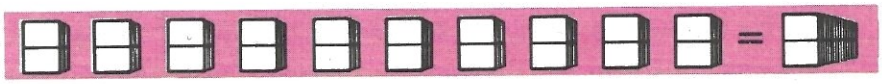
3. Read the story the picture at the top of the page tells.

4. Below, you see 10 tens in a row.



We can put 10 tens together. They will look like the large bundle you see at the left. Ten 10's are 100 cards in all. Show this by counting the cards in the ten bundles by 10's. That is why we call a bundle of 10 tens 1 **hundred.**

Read the story the picture below tells.



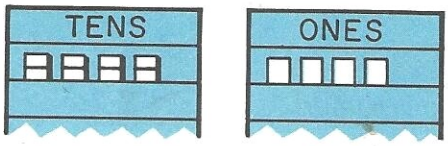
10 tens = ▣ hundred

▣ **ones join to make 1 ten.**

▣ **tens join to make 1 hundred.**

In this book we will show and work with little cards. We will use a card holder to show place value. On the next page you will see how we use the cards.

What a Two-Place Numeral Means

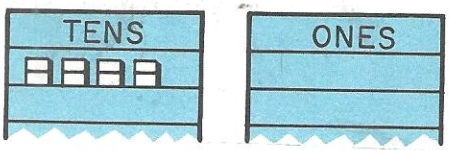


1. Place 4 bundles of cards and 4 single cards in the card holders. See how at the left. You see 4 tens and 4 ones.

2. Count by tens to see how many cards there are in the 4 bundles. 4 tens are called **forty.** Next, count the single ones. 4 ones are called **four.**

3. In the card holders there are 44 (forty-four) cards. 44 is a **two-place numeral. The place in which each 4 is written gives each 4 its name and its meaning.** In the numeral 44, which 4 means 4 tens? Which 4 means 4 ones?

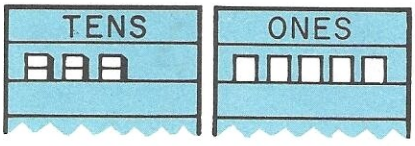
4. Use bundles of cards and single cards. Show these two-place numerals in card holders: 32, 21, 43, 67, 95.



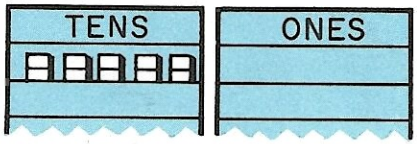
5. Place 4 bundles of tens in the tens' card holder. Count the cards by tens. Forty is 4 tens. There are no ones. Write forty like this: 40. The 0 in 40 means there are no ones in ones' place. In the numeral 40, the 0 must hold ones' place. Then the 4 will be in the place for tens.

6. What numeral would you write for A? for B?

A



B

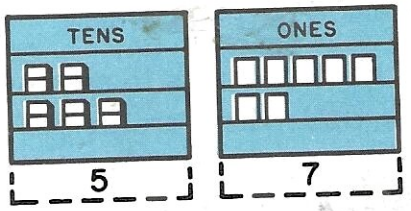


Learn by Doing: Adding Tens and Ones

There were 25 boys and 32 girls in the school play. How many children were in the play?

Use two card holders. With bundles of tens and single cards, your class can show how to add

$$\begin{array}{r} 25 \\ +32. \\ \hline \end{array}$$



How many boys were there?
How will you show 25?
How many girls were there?
How will you show 32?

Place 32 tickets in the card holders below the 25.

Begin with the ones.

How many ones in all are 5 ones and 2 ones?
How many tens in all are 2 tens and 3 tens?
What number is named by 5 tens and 7 ones?
How many children were in the school play?

A. First we added the ones. Then, we added the tens.

$$\begin{array}{rl} 25 & = 20 + 5 \\ +32 & = 30 + 2 \\ \hline & 50 + 7 = 57 \end{array}$$

B. Now work this example a shorter way as shown below.

$$\begin{array}{r} 25 \\ +32 \\ \hline 7 \end{array}$$

Step 1: Add the ones first.

See: 5 Think:
+2. 5 ones + 2 ones = 7 ones.

Write 7 in ones' place on your paper.

Step 2: Next add the tens.

$$\begin{array}{r} 25 \\ +32 \\ \hline 57 \end{array}$$

See: 2 Think:
+3. 2 tens + 3 tens = 5 tens.

Write 5 in tens' place on your paper.

How many children were in the school play?

322 Practice Adding Tens and Ones

Each example below is done as in B on page 50. Rework the examples as shown in A.

73	11	25	83	46	51
+21	+57	+32	+13	+32	+31
94	68	57	96	78	82

Copy and find the sums. Use the way shown in B.

1. 12 42 64 43 32 25
   84 47 35 16 52 64

2. 21 + 52 = ▣ 12 + 67 = ▣ 47 + 51 = ▣

3. 51 + 44 = ▣ 23 + 16 = ▣ 35 + 21 = ▣

4. 51 31 45 36 64 45
   36 47 42 52 32 42

5. 67 + 12 = ▣ 24 + 75 = ▣ 12 + 46 = ▣

6. 12 + 85 = ▣ 63 + 25 = ▣ 32 + 47 = ▣

Practice in Renaming Numbers

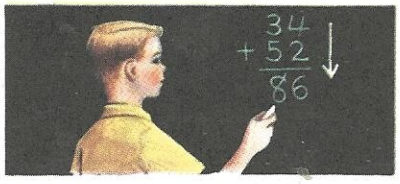
We can rename a number as two addends. For example, $6 = 4 + 2$.

Also we know that we group numbers as tens and ones. For example, $64 = 60 + 4$.

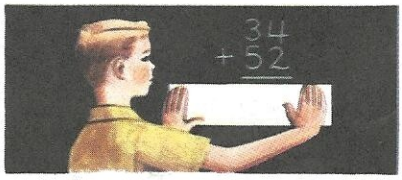
Rename each of the following as two addends. The first one in row 1 has been done for you.

1. a. $32 = 30 + 2$ b. $72 = ▣ + △$ c. $44 = ▣ + △$
2. a. $56 = ▣ + △$ b. $90 = ▣ + △$ c. $52 = ▣ + △$
3. a. $41 = ▣ + △$ b. $53 = ▣ + △$ c. $67 = ▣ + △$

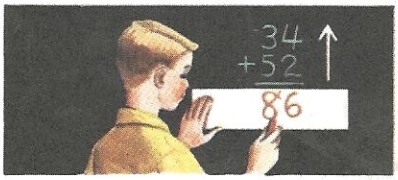
How to Be Sure Your Sums Are Correct



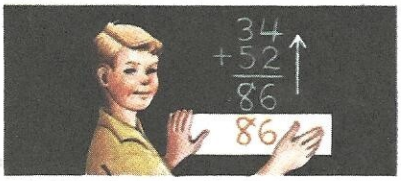
Tommy adds from the top down: 4 + 2; 30 + 50.



He covers the sum with a slip of paper.



Tommy adds again from the bottom up: 2 + 4; 5 tens + 3 tens.



He moves the paper down. Both sums are the same. The work **checks.**

When checking addition what law do we use? What do we do to change the order of the numbers we are adding?

Work these examples. Use Tommy's way to check each example. Be sure your sums are right.

1.	2.	3.	4.	5.
24	52	42	45 cents	42 cents
73	37	44	32 cents	57 cents

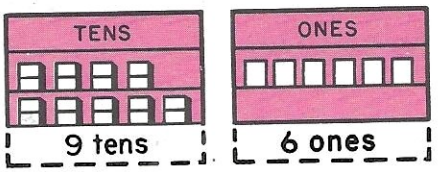
Draw Pictures for These Problems

For each problem: (1) Draw the picture. (2) Write the number sentence the picture shows. (3) Solve the number sentence.

1. There were 10 cans of corn in a row. Judy bought 3 cans. How many cans of corn were left? (page 17)

2. Peter bought 3 large bananas and 7 small bananas. How many bananas did he buy? (page 12)

3. Mary has 10 jacks. Ann has 6 jacks. How many more jacks than Ann has Mary? (page 30)



322 Be Careful of the Zeros

1. Use bundles of tens and single cards. Show how to add: $\begin{array}{r} 46 \\ +50. \end{array}$ The zero in 50 tells us we have no ones in ones' place. In ones' place you see 6 + 0. There are no ones to add to 6 ones.

A. $\begin{array}{r} 46 = 40 + 6 \\ +50 = 50 \\ \hline 90 + 6 = 96 \end{array}$ Write 6 in ones' place. Finish the example by adding the tens.

B. $\begin{array}{r} 46 \\ +50 \\ \hline 96 \end{array}$

When we add zero to a number the sum is the same as the number.

$\begin{array}{r} 41 \\ +20 \\ \hline 61 \end{array}$ $\begin{array}{r} 32 \\ +60 \\ \hline 92 \end{array}$ $\begin{array}{r} 14 \\ +70 \end{array}$ $\begin{array}{r} 65 \\ +10 \end{array}$ $\begin{array}{r} 26 \\ +30 \end{array}$ $\begin{array}{r} 40 \\ +30 \end{array}$ $\begin{array}{r} 53 \\ +30 \end{array}$

2. Use bundles of tens and single cards. Show how to add: $\begin{array}{r} 40 \\ +56. \end{array}$ What does the zero in 40 tell us? In ones' place see 0 + 6. Think: There are only 6 ones. There are no ones to which to add the 6 ones.

A. $\begin{array}{r} 40 = 40 \\ +56 = 50 + 6 \\ \hline 90 + 6 = 96 \end{array}$ Write 6 in ones' place. Finish the example by adding the tens.

B. $\begin{array}{r} 40 \\ +56 \\ \hline 96 \end{array}$

When we add a number to zero the sum is the same as the number.

$\begin{array}{r} 20 \\ +41 \\ \hline 61 \end{array}$ $\begin{array}{r} 30 \\ +53 \\ \hline 83 \end{array}$ $\begin{array}{r} 70 \\ +14 \end{array}$ $\begin{array}{r} 10 \\ +65 \end{array}$ $\begin{array}{r} 30 \\ +26 \end{array}$ $\begin{array}{r} 30 \\ +40 \end{array}$ $\begin{array}{r} 60 \\ +32 \end{array}$

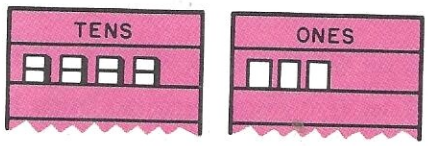
30 + 41 = ▣ 50 + 27 = ▣ 84 + 10 = ▣

48 + 30 = ▣ 24 + 60 = ▣ 40 + 28 = ▣

Subtracting Tens and Ones

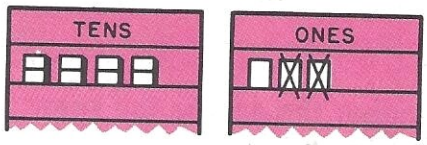
Use bundles of tens and single cards. Show how to subtract in the example at the right.

$$\begin{array}{r} 43 \\ -12 \\ \hline \end{array}$$

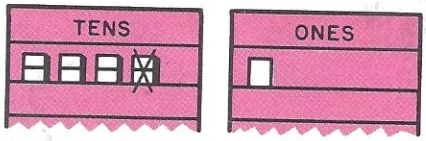


Show 43 with 4 tens and 3 ones. $43 = 40 + 3$.

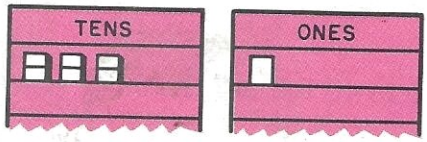
Think: $12 = 10 + 2$. I must take 1 ten and 2 ones from the cards in the card holders. See how below.



First, take out the 2 ones. How many ones are left?



Next, take out the 1 ten. How many tens are left?



How many cards are now shown in the card holders? Study the example below.

A. First, subtract the ones. Then, subtract the tens.

$$\begin{array}{rcl} 43 & = & 40 + 3 \\ -\,12 & = & 10 + 2 \\ \hline & & 30 + 1 = 31 \end{array}$$

B.
$$\begin{array}{r} 43 \\ -\,12 \\ \hline 1 \end{array}$$

Step 1: First, subtract the ones.
Think: 3 ones − 2 ones = 1 one.
Write 1 in ones' place.

$$\begin{array}{r} 43 \\ -\,12 \\ \hline 31 \end{array}$$

Step 2: Next, subtract the tens.
Think: 4 tens − 1 ten = 3 tens.
Write 3 in tens' place.
What is the remainder?

323 Let's Subtract

First work each example below as in A on page 54, then as in B. Tell how each remainder was found.

41	87	79	69	74	65
31	47	58	49	42	32
10	40	21	20	32	33

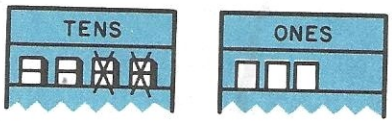
Work the examples in row 1 in the two ways shown in A and B on page 54. Use just form B for rows 2 and 3.

1. $28 - 13 = \blacksquare$ $\quad 63 - 23 = \blacksquare$ $\quad 79 - 23 = \blacksquare$
2. $98 - 42 = \blacksquare$ $\quad 75 - 63 = \blacksquare$ $\quad 72 - 32 = \blacksquare$

3. 89	85	99	68	98	96
67	55	86	18	48	56

323 Subtracting Tens from Tens and Ones

With bundles of tens and single cards, show how to subtract: $\begin{array}{r} 43 \\ -20. \\ \hline \end{array}$



The zero in 20 in ones' place tells us we have no ones to subtract from 3 ones. The 2 in 20 tells us we have 2 tens to subtract from 4 tens.

A. $43 = 40 + 3$
$-20 = 20$
$20 + 3 = 23$

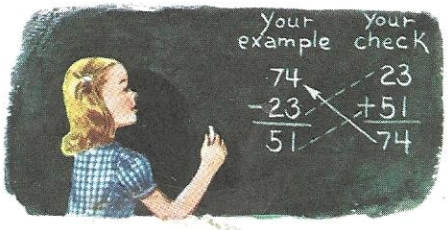
Write 3 in ones' place. Finish the example by subtracting the tens.

B. $\begin{array}{r} 43 \\ -20 \\ \hline 23 \end{array}$

When we subtract zero from a number, the remainder is the same as the number.

67	75	98	94	89	93	70
40	60	70	60	30	80	50
27	15					

How to Be Sure Your Remainders Are Right



See how to check your subtraction work.

In a subtraction what do we know and what do we seek?

In an addition what do we know and what do we seek?

How does the check show addition and subtraction as opposite operations?

Work these examples. Check each example.

1.	2.	3.	4.	5.	6.
78	78	89	79	90	89
−40	−53	−20	−26	−70	−43

Subtraction Number Sentences to Write

In each number sentence write the missing numeral.

10 minus 6 = ▢	10 − ▢ = 2	10 less 9 = ▢
7 from 10 = ▢	10 − ▢ = 8	10 take away 1 = ▢
10 is ▢ more than 3	10 − 9 = ▢	1 and ▢ more = 10

Let's Add

Find the sums. Check each answer. What law do you use when you check?

1.							
	14	78	65	12	40	72	54
	84	20	34	30	55	14	13

2. 24 + 62 = ▢ 30 + 66 = ▢ 12 + 47 = ▢

3. 24 + 10 = ▢ 32 + 53 = ▢ 42 + 12 = ▢

4.							
	20	57	16	50	31	10	10
	53	30	72	20	41	29	62

Keep on the Trail

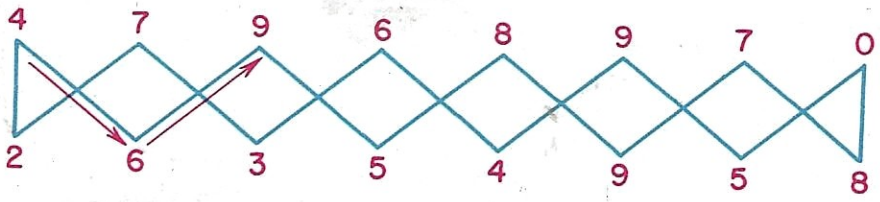
1. $\begin{array}{r} 47 \\ +22 \\ \hline \end{array}$ $\begin{array}{r} 44 \\ -12 \\ \hline \end{array}$ $\begin{array}{r} 67 \\ -30 \\ \hline \end{array}$ $\begin{array}{r} 26 \\ +53 \\ \hline \end{array}$ $\begin{array}{r} 30 \\ +10 \\ \hline \end{array}$ $\begin{array}{r} 50 \\ -40 \\ \hline \end{array}$ $\begin{array}{r} 24 \\ +75 \\ \hline \end{array}$

2. $76 - 34 = \square$ $65 - 50 = \square$ $43 + 36 = \square$

3. $80 + 16 = \square$ $77 - 27 = \square$ $76 - 12 = \square$

4. $\begin{array}{r} 89 \\ -69 \\ \hline \end{array}$ $\begin{array}{r} 76 \\ -60 \\ \hline \end{array}$ $\begin{array}{r} 54 \\ +20 \\ \hline \end{array}$ $\begin{array}{r} 70 \\ -40 \\ \hline \end{array}$ $\begin{array}{r} 50 \\ +47 \\ \hline \end{array}$ $\begin{array}{r} 89 \\ -71 \\ \hline \end{array}$ $\begin{array}{r} 61 \\ +18 \\ \hline \end{array}$

5. $62 - 41 = \square$ $58 + 20 = \square$ $78 - 30 = \square$



Zigzag Game

1. Follow the zigzag over and under from point to point. Each time think: If I take this number away from 10, what is the remainder?

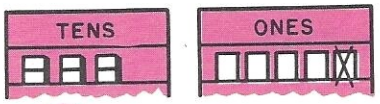
2. Play the game again. This time think: What number is needed to make 10 in all?

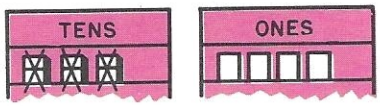
Practice with Problems

1. Joe has 5¢ in a piggy bank, 2¢ in his hand, and 2¢ in his pocket. How much money has he in all?

2. Nancy wants 10 cents for a hair bow. She has 6 cents. How many more cents does she need?

3. Tony's father has 10 neckties. Tony has 2 neckties. How many more neckties has Father than Tony?

A 

B 

323 A One-Digit Remainder in Subtraction

Miss Brown's class took 35 tickets to sell for the school play. They have sold 31 tickets. How many are left?

The pictures above will help you see the steps below.

A.
$$\begin{array}{r} 35 = 30 + 5 \\ -\,31 = 30 + 1 \\ \hline 4 \end{array}$$

First, subtract the ones. $5 - 1 = 4$. Next, subtract $30 - 30 = 0$. Do not write 0 in the remainder.

B.
$$\begin{array}{r} 35 \\ -\,31 \\ \hline 4 \end{array}$$

Step 1: First, subtract the ones.

5

In ones' place see -1. Think: $5 - 1 = 4$.

Write 4 in ones' place.

Step 2: Next, subtract the tens.

$$\begin{array}{r} 35 \\ -\,31 \\ \hline 4 \end{array}$$

3

In tens' place see -3.

Think: 3 tens $-$ 3 tens $=$ 0 tens.

There will be no tens in this remainder.

Do not write 0 in the remainder.

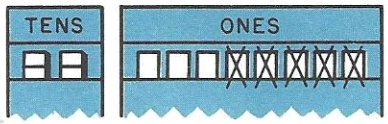
Use form A to rework the first three examples below. Then use form B to work the other examples. Check your answers.

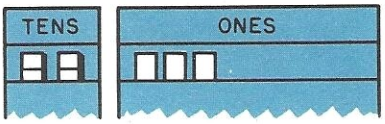
1.
$$\begin{array}{rrr} 85 & 64 & 28 \\ -82 & -64 & -20 \\ \hline 3 & 0 & 8 \end{array} \qquad \begin{array}{rrrr} 59 & 40 & 34 & 94 \\ -52 & -40 & -34 & -93 \end{array}$$

2. $61 - 61 = \square$ $\qquad 99 - 93 = \square$ $\qquad 18 - 15 = \square$

3. $89 - 87 = \square$ $\qquad 80 - 80 = \square$ $\qquad 79 - 76 = \square$

4.
$$\begin{array}{rrrrrrr} 87 & 96 & 67 & 89 & 79 & 86 & 78 \\ -75 & -96 & -23 & -81 & -70 & -65 & -22 \end{array}$$

A 

B 

324 Subtracting Ones from Tens and Ones

Miss Hill's class has 28 tickets to sell for the school play. John said, "I will take 5 tickets to sell." How many tickets are left to be sold?

The pictures above will help you see the steps below.

A. $28 = 20 + 8$
$\underline{-5} = \underline{\quad 5}$
$20 + 3 = 23$

B. $\begin{array}{r} 28 \\ -\ 5 \\ \hline 3 \end{array}$

Step 1: First, subtract the ones.

8

See $\underline{-5}$. Think 3. Write 3 in ones' place.

Step 2: Next, see if there are any tens to subtract.

$\begin{array}{r} 28 \\ -\ 5 \\ \hline 23 \end{array}$

2

In tens' place see $\underline{-\ }$. This means there are no tens to subtract from 2 tens. Write 2 in tens' place. What is the remainder?

Use form A to rework the first three examples below. Then use form B to work the other examples. Check.

1. $\begin{array}{r} 69 \\ -3 \\ \hline 66 \end{array}$ $\begin{array}{r} 38 \\ -4 \\ \hline 34 \end{array}$ $\begin{array}{r} 76 \\ -6 \\ \hline 70 \end{array}$ $\begin{array}{r} 98 \\ -0 \\ \hline \end{array}$ $\begin{array}{r} 49 \\ -9 \\ \hline \end{array}$ $\begin{array}{r} 84 \\ -0 \\ \hline \end{array}$ $\begin{array}{r} 19 \\ -6 \\ \hline \end{array}$

2. $29 - 8 = \square$ $36 - 3 = \square$ $59 - 8 = \square$

3. $98 - 1 = \square$ $68 - 8 = \square$ $45 - 1 = \square$

4. $\begin{array}{r} 36 \\ -21 \\ \hline \end{array}$ $\begin{array}{r} 28 \\ -23 \\ \hline \end{array}$ $\begin{array}{r} 65 \\ -3 \\ \hline \end{array}$ $\begin{array}{r} 73 \\ -10 \\ \hline \end{array}$ $\begin{array}{r} 92 \\ -0 \\ \hline \end{array}$ $\begin{array}{r} 90 \\ -90 \\ \hline \end{array}$ $\begin{array}{r} 54 \\ -1 \\ \hline \end{array}$

Keep on the Trail

1.

31	98	30	65	90	53	28
+27	−41	+65	−62	−50	+13	−6

2. $80 + 12 = \square$ $\quad 12 + 64 = \square$ $\quad 40 + 50 = \square$

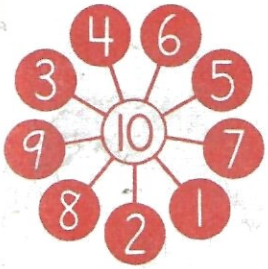
3. $54 - 10 = \square$ $\quad 90 - 80 = \square$ $\quad 37 - 4 = \square$

4.

49	10	69	20	83	28	42
−41	+50	−12	+74	−70	+60	−0

5. $86 - 30 = \square$ $\quad 42 + 23 = \square$ $\quad 0 + 29 = \square$

Take a Ride on This Merry-Go-Round



1. Subtract the number named in each colored disk from the 10 named in the middle circle. What is each remainder?

2. Play the game again. This time think: What number must be added to the number named in each colored disk to make 10 in all?

Milk at School

Write a number sentence for each problem. Solve the number sentence and label your answer.

1. Mary had 10 cents. She paid 6 cents for a bottle of milk. How much money did she have left?

2. In Jim's class 8 children have been buying milk. Today 2 more children have started to buy milk. How many children in all are now buying milk?

3. Ten children are ready to drink their milk. They have only 8 straws. They need how many more straws?

Let's Add

1.	5	3	2	3	5	2	2
	3	1	4	3	0	5	0
	2	6	3	3	5	3	6

2.

Sam said, "This column has two missing numerals. We know the sum is 10. I can think of 8 different ways to fill in the right missing numerals." Try to find more ways than Sam found.

Grouping in Addition

1. Here is another way to show the first example in row 1 above.

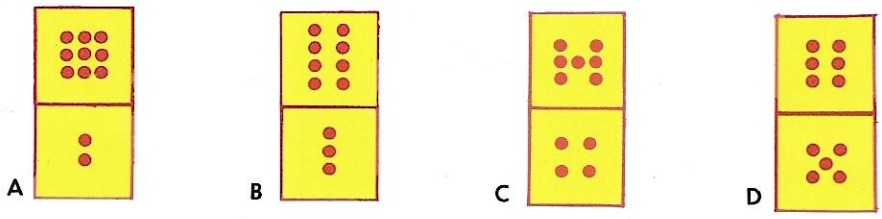
A. To find the sum, use this grouping:	B. This time, use the grouping shown below.
$(5+3) + 2 =$	$5 + (3+2) =$
$8 + 2 = 10$	$5 + 5 = 10$

2. How is $(5+3) + 2$ different from $5 + (3+2)$?

Did changing the way the numbers to be added were grouped change the sum? What does the Law of Grouping for Addition say?

Use the Law of Grouping for Addition in the examples below. First find the sum by grouping as in **A**, then find the sum by grouping as in **B**. Show that changing the way the numbers to be added are grouped does not change the sum.

3. **A.** $(4 + 2) + 3 =$ ▩	5. **A.** $(4 + 4) + 2 =$ ▩
B. $4 + (2 + 3) =$ ▩	**B.** $4 + (4 + 2) =$ ▩
4. **A.** $2 + (3 + 1) =$ ▩	6. **A.** $3 + (4 + 2) =$ ▩
B. $(2 + 3) + 1 =$ ▩	**B.** $(3 + 4) + 2 =$ ▩



Number Families about Eleven

1. For each disk picture above, do two things:

   a. Tell how the 11 disks are grouped.

   b. Match the four related number facts below with the correct picture. Point to or cover the groups of disks as you say each of the four related number facts.

A	9 + 2 = 11	2 + 9 = ■	11 − 2 = ■	11 − 9 = ■
B	8 + 3 = 11	3 + 8 = ■	11 − 3 = ■	11 − 8 = ■
C	7 + 4 = 11	4 + 7 = ■	11 − 4 = ■	11 − 7 = ■
D	6 + 5 = 11	5 + 6 = ■	11 − 5 = ■	11 − 6 = ■

2. In each group of four related number facts above, find the pair of number facts which show the Law of Order for Addition. Copy each pair on your paper.

3. Notice that in each subtraction fact you begin with the sum of the related addition fact. What do you take away? What is the answer?

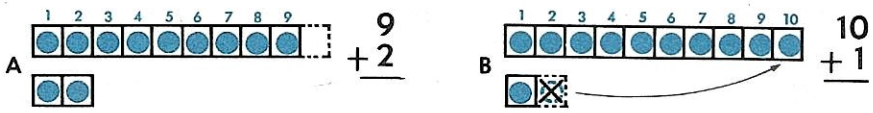
4. Use the Law of Grouping and other names for a number to get other number facts.

a. $2 + 9 = 2 + (6+3)$
$2 + (6+3) = (2+6) + 3$
$(2+6) + 3 = 8 + 3 = \blacksquare$

b. $2 + 9 = 2 + (5+4)$
$2 + (5+4) = (2+5) + 4$
$(2+5) + 4 = 7 + 4 = \blacksquare$

c. $2 + 9 = 2 + (4+5)$
$2 + (4+5) = (2+4) + 5$
$(2+4) + 5 = 6 + 5 = \blacksquare$

d. $3 + 8 = 3 + (6+2)$
$3 + (6+2) = (3+6) + 2$
$(3+6) + 2 = 9 + 2 = \blacksquare$



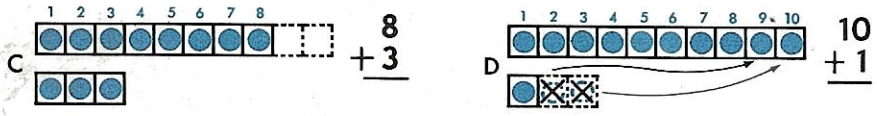
Working with Elevens

1. Pictures **A** and **B** above will help you to see how the Law of Grouping can help you to remember $9 + 2$.

$$9 + 2 = 9 + (1 + 1)$$
$$9 + (1 + 1) = (9 + 1) + 1$$
$$(9 + 1) + 1 = 10 + 1 = \blacksquare$$

2. The Law of Order will help you to remember $2 + 9$. If you know $9 + 2 = 2 + 9$, then you know $2 + 9$ is also $\blacksquare$.

3. Pictures **C** and **D** below will help you to see how the Law of Grouping can help you to remember $8 + 3$.



$$8 + 3 = 8 + (2 + 1)$$
$$8 + (2 + 1) = (8 + 2) + 1$$
$$(8 + 2) + 1 = 10 + 1 = \blacksquare$$

4. How does the Law of Order help you to remember $3 + 8$?

5. Begin at the bottom to climb each ladder.

a	b	c
$11 - 8$	$11 - 6$	$11 - 7$
$3 + 8$	$5 + 6$	$4 + 7$
$11 - 3$	$11 - 5$	$11 - 4$
$8 + 3$	$6 + 5$	$7 + 4$

6. Name the missing number in each number sentence.

$2 + 9 = \blacksquare$	$6 + 5 = \blacksquare$
$2 + \blacksquare = 11$	$6 + \blacksquare = 11$
$11 - 2 = \blacksquare$	$11 - 6 = \blacksquare$
$11 - \blacksquare = 9$	$11 - \blacksquare = 6$
$\blacksquare - 2 = 9$	$\blacksquare - 6 = 5$
$\blacksquare - 9 = 2$	$\blacksquare - 5 = 6$

Adding Ones to Numbers Greater than Ten

Use bundles of tens and single cards. Show how to add the example at the right.

$$\begin{array}{r} 14 \\ +\ 5 \\ \hline \end{array}$$

1. Show 14 with 1 ten and 4 ones. **14 = 10 + 4**
2. Show 5 more ones added to the ones' card holder.
3. Begin with the ones. 4 ones + 5 ones = △ ones.
4. How many tens do you have?
5. What is the sum of 14 + 5?

Now work this example without the cards.

A.
$$\begin{array}{rl} 14 = & 10 + 4 \\ +5 = & \quad\ 5 \\ \hline & 10 + 9 = \square \end{array}$$

B.
$$\begin{array}{r} 14 \\ +\ 5 \\ \hline 9 \end{array}$$

Step 1: Begin with the ones.

4

See +5. Think 9. Write 9 in ones' place.

$$\begin{array}{r} 14 \\ +\ 5 \\ \hline 19 \end{array}$$

Step 2: Next add the tens.

There are no tens to add to the 1 ten.

Write 1 in tens' place.

324 Rework the first four examples in row 1 as in A. Work the other examples as in B. Check each answer.

1.
$$\begin{array}{rrrr} 13 & 23 & 6 & 6 \\ +6 & +6 & +13 & +23 \\ \hline 19 & 29 & 19 & 29 \end{array} \qquad \begin{array}{r} 5 \\ +3 \\ \hline \end{array} \qquad \begin{array}{r} 25 \\ +3 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ +23 \\ \hline \end{array}$$

2.
$$\begin{array}{rrrrrrr} 2 & 12 & 22 & 32 & 2 & 2 & 2 \\ +7 & +7 & +7 & +7 & +47 & +57 & +67 \end{array}$$

3. 5 + 4 = ▩ 45 + 4 = ▩ 5 + 94 = ▩

4. 85 + 4 = ▩ 75 + 4 = ▩ 5 + 34 = ▩

Keep on the Trail

1.	69	30	21	2	59	85
	−10	+54	+61	+67	−32	−81

2. $7 + 42 = \square$ $\quad 49 + 20 = \square$ $\quad 98 - 78 = \square$

3. $67 - 27 = \square$ $\quad 37 - 2 = \square$ $\quad 44 + 5 = \square$

4.	70	6	90	86	98	96
	+20	+50	−60	−6	−92	−50

5. $32 + 45 = \square$ $\quad 64 - 52 = \square$ $\quad 78 - 5 = \square$

The Football Team Practices

How many players are on a football team? How many are there on this boys' team?

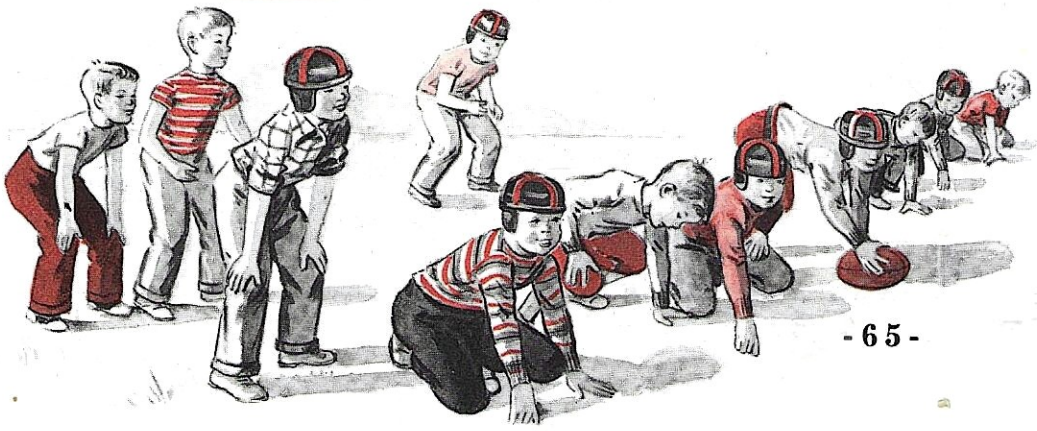
Write a number sentence for each problem.

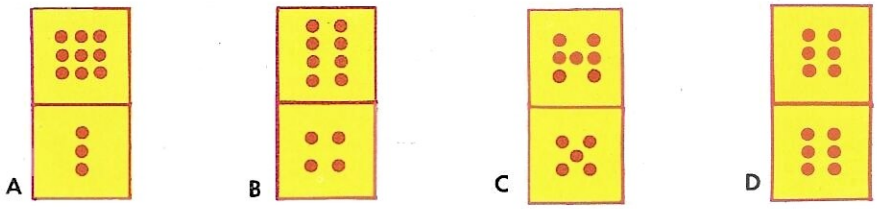
1. Seven of the 11 boys are in the line. The others are in the backfield. How many players are in the backfield?

2. All 11 boys will need helmets. How many have their helmets? How many more helmets are needed?

3. There are 11 players on a football team. There are 9 players on a baseball team. How many more players are on a football team than on a baseball team?

4. Three of the boys had to go home. How many boys were left?





Number Families about Twelve

1. For each disk picture above, do two things:

   a. Tell how the 12 disks are grouped.

   b. Match the groups of related number facts below with the correct picture. Point to or cover the groups of disks as you say each of the matching related number facts.

A	9 + 3 = 12	3 + 9 = △	12 − 3 = △	12 − 9 = △
B	8 + 4 = 12	4 + 8 = △	12 − 4 = △	12 − 8 = △
C	7 + 5 = 12	5 + 7 = △	12 − 5 = △	12 − 7 = △
D		6 + 6 = 12	12 − 6 = △	

2. In each group of four related number facts in **A**, **B**, and **C** above, find the pair of number facts which show the Law of Order. Copy each pair on your paper.

3. Show that in each subtraction fact you begin with the sum of the related addition fact. You take away one of the addends. The remainder is the other addend.

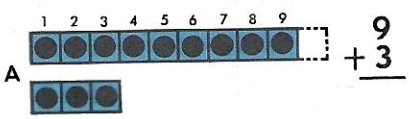
4. Use the Law of Grouping and other names for a number to help you get other number facts.

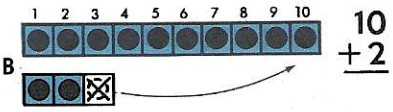
a. $3 + 9 = 3 + (5+4)$
$3 + (5+4) = (3+5) + 4$
$(3+5) + 4 = 8 + 4 = \blacksquare$

b. $3 + 9 = 3 + (4+5)$
$3 + (4+5) = (3+4) + 5$
$(3+4) + 5 = 7 + 5 = \blacksquare$

c. $3 + 9 = 3 + (3+6)$
$3 + (3+6) = (3+3) + 6$
$(3+3) + 6 = 6 + 6 = \blacksquare$

d. $8 + 4 = 8 + (1+3)$
$8 + (1+3) = (8+1) + 3$
$(8+1) + 3 = 9 + 3 = \blacksquare$





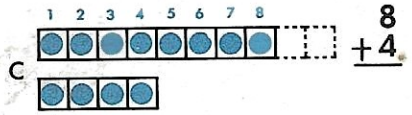
Working with Twelves

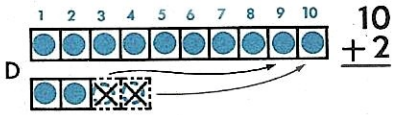
1. Pictures A and B above will help you to see how the Law of Grouping can help you to remember $9 + 3$.

$$9 + 3 = 9 + (1 + 2)$$
$$9 + (1 + 2) = (9 + 1) + 2$$
$$(9 + 1) + 2 = 10 + 2 = \square$$

2. The Law of Order will help you to remember $3 + 9$. If you know $9 + 3 = 3 + 9$, you know $3 + 9$ is also $\square$.

3. Pictures C and D below will help you to see how the Law of Grouping can help you to remember $8 + 4$.





$$8 + 4 = 8 + (2 + 2)$$
$$8 + (2 + 2) = (8 + 2) + 2$$
$$(8 + 2) + 2 = 10 + 2 = \square$$

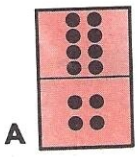
4. If you know $8 + 4 = 12$, how does the Law of Order help you to remember $4 + 8$?

5. Begin at the bottom to climb each ladder.

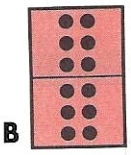
a	b	c
$12 - 7$	$12 - 9$	$12 - 8$
$5 + 7$	$3 + 9$	$4 + 8$
$12 - 5$	$12 - 3$	$12 - 4$
$7 + 5$	$9 + 3$	$8 + 4$

6. Name the missing number.

$3 + 9 = \square$	$8 + 4 = \square$
$3 + \square = 12$	$8 + \square = 12$
$12 - 9 = \square$	$12 - 4 = \square$
$12 - \square = 3$	$12 - \square = 8$
$\square - 3 = 9$	$\square - 4 = 8$
$\square - 9 = 3$	$\square - 8 = 4$



$$\begin{array}{cccc} 8 & 4 & 12 & 12 \\ +4 & +8 & -4 & -8 \\ \square & \square & \square & \square \end{array}$$



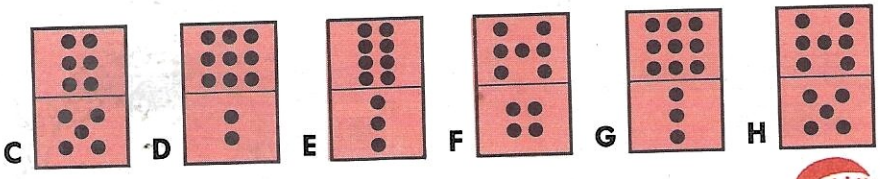
$$\begin{array}{cc} 6 & 12 \\ +6 & -6 \\ \square & \square \end{array}$$

Number Families

1. There are four related number facts for Picture A above. On paper copy the disk picture. Beside the picture you draw, write the four related number facts and their answers.

2. Why are there only two related number facts for Picture B? Copy the disk picture. Beside it write the two related number facts and their answers.

3. Copy each disk picture below. Beside each write the four related number facts you can show with the picture.



Practicing Number Facts

Say the answers. Write the answers on a folded paper. Make a practice card for each number fact you do not know.

$$\begin{array}{cccccccc} 8 & 5 & 9 & 5 & 11 & 12 & 11 & 12 \\ +3 & +7 & +2 & +6 & -7 & -9 & -5 & -3 \end{array}$$

$7 + 5 = \square$ $\quad 6 + 5 = \square$ $\quad 11 - 2 = \square$ $\quad 11 - 8 = \square$

$3 + 8 = \square$ $\quad 4 + 8 = \square$ $\quad 12 - 4 = \square$ $\quad 12 - 8 = \square$

$$\begin{array}{cccccccc} 4 & 9 & 6 & 2 & 12 & 11 & 12 & 11 \\ +7 & +3 & +6 & +9 & -7 & -3 & -6 & -4 \end{array}$$

$7 + 4 = \square$ $\quad 8 + 4 = \square$ $\quad 11 - 9 = \square$ $\quad 12 - 8 = \square$

$3 + 9 = \square$ $\quad 12 - 5 = \square$ $\quad 11 - 6 = \square$ $\quad 12 - 7 = \square$

Buying by the Dozen

Rita wants to buy a dozen eggs and a dozen oranges.

1. The box holds one dozen eggs. How many eggs are there in the box?

2. How many bananas do you see? How many more are needed to make a dozen bananas?

3. Rita buys a dozen oranges. How many oranges are there in a dozen? Draw one dozen oranges. Use your picture to find how many oranges are in **one half** dozen.

4. Rita's family eats 5 eggs for breakfast. How many eggs will be left from a dozen after breakfast? How many would be left if they used 8 eggs? 6? 9? 3? 7? 4?

5. How many oranges would be left from the dozen if the family used 4 oranges? 6? 3? 9? 7? 5? 8?

6. Rita bought a dozen little cakes. How many would be left if the family ate 7 cakes? 5? 9? 3? 8? 4? 6?

7. Rita's mother needs a dozen paper cups. She has 7 paper cups. How many more does she need? How many more are needed if she has 6 paper cups? 8? 5? 9?

There are 12 things in one dozen.
There are 6 things in one half dozen.

Adding Three Numbers

Don and Jim are playing a game. Each boy takes 3 turns. They add the number of pins they knock down each time to get their score. This is how Jim found his score.

$$(7 + 4) + 6 = 11 + 6 = 17$$

$$\begin{array}{r} 7 \\ 4 \\ 6 \\ \hline 17 \end{array}$$

Begin adding with the 7.

Step 1: What two numbers do you add first?

Step 2: What number do you add to 11?

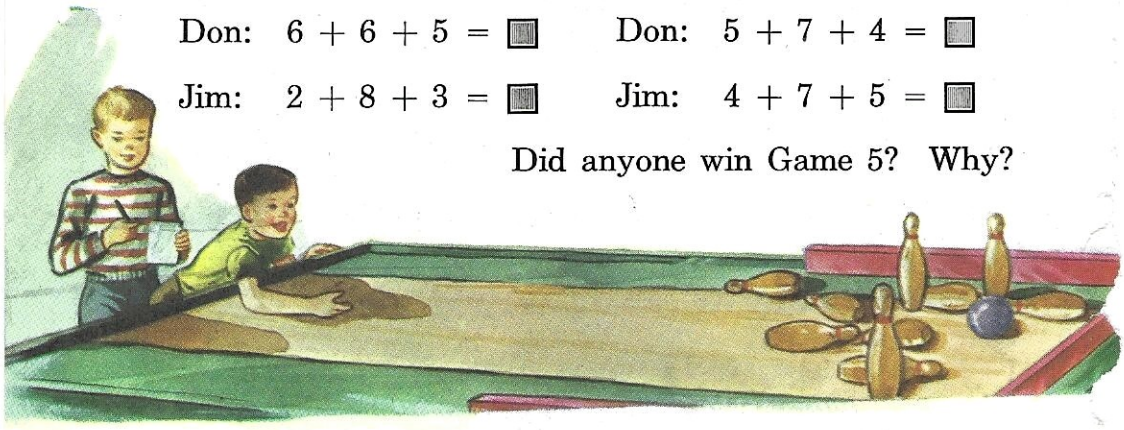
17 is 1 ten and 7 ones. Write 17 as shown.
To check, add from the bottom up.
How is the Law of Grouping used in working this example?
How is the Law of Order used in checking this example?

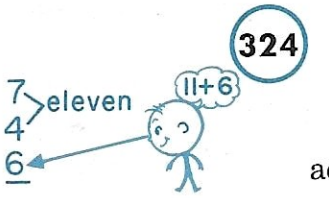
Find who won each game. Check each score.

Game 1		Game 2		Game 3	
Don	Jim	Don	Jim	Don	Jim
7	7	5	9	6	3
3	4	6	2	5	8
8	6	4	8	5	2

Game 4		Game 5	
Don:	$6 + 6 + 5 = \square$	Don:	$5 + 7 + 4 = \square$
Jim:	$2 + 8 + 3 = \square$	Jim:	$4 + 7 + 5 = \square$

Did anyone win Game 5? Why?





324 Practicing Addition

See how Jim found his first score. He added 6 to the eleven he was thinking.

Say the sums for each group below.

Group 1	Group 2	Group 3
Ten and 2	Ten and 9	Twelve and 2
Ten and 7	Eleven and 4	Twelve and 7
Ten and 1	Eleven and 2	Twelve and 4
Ten and 5	Eleven and 8	Twelve and 1
Ten and 3	Eleven and 7	Twelve and 6
Ten and 8	Eleven and 1	Twelve and 3
Ten and 4	Eleven and 3	Twelve and 5
Ten and 6	Eleven and 5	Twelve and 0

Lay a folded paper beside each group of examples above. Write the answer for each example on your paper.

Next, lay your paper from left to right under each line of examples above. Write the answers on a folded paper. Fold under your answers for each new line.

Add and check each answer below. On your paper put a ring around each example in which you can use the Law of Grouping to make a ten.

Let's Add

1.	3	4	1	7	8	8	9	6	4	7
	8	6	9	4	2	3	1	6	6	5
	3	5	2	7	9	8	1	6	4	5
2.	5	7	3	2	9	8	2	3	7	8
	5	5	9	9	3	4	8	9	4	2
	6	7	2	1	7	6	1	1	8	8

Practicing Addition Facts

Say the answers. Write them on folded paper. Study the practice cards of the facts you miss.

3	5	3	9	8	7	2	4	5
+7	+6	+9	+1	+4	+4	+9	+8	+5
2	4	7	8	4	9	6	1	6
+8	+7	+5	+3	+6	+0	+6	+9	+5

9 + 3 = ■	8 + 2 = ■	9 + 2 = ■	4 + 5 = ■
6 + 4 = ■	5 + 7 = ■	7 + 3 = ■	3 + 8 = ■
1 + 8 = ■	3 + 9 = ■	5 + 6 = ■	7 + 5 = ■

1. Use another name for 3 and the Law of Grouping to find the sum for 9 + 3.

2. Write the facts which have a sum of 12.

Bill Makes a Discovery

6
0
4
10

Bill wrote this example on the board. Then he named the sum. He said, "Up and down in a column, 0 just means not any. But left to right in a numeral like 10, the 0 tells us we have no ones. Use Bill's example to show he is right. Then tell what zero means in each problem below.

1. Jim made 6 points in the first race and 0 points in the second race. He made 5 points in the third race. How many points did he make in all in the three races?

2. In a dart game Jane made 15 points. Sue made 10 points. How many more points did Jane make than Sue made?

Practicing Subtraction Facts

Say the answers. Write them on a folded paper. Study the practice cards of the facts you miss.

12	11	12	10	11	12	10	10	12
−3	−3	−7	−7	−9	−9	−8	−6	−4
10	11	12	9	10	11	9	11	10
−1	−6	−6	−9	−4	−8	−8	−4	−2

10 − 5 = ▢	11 − 2 = ▢	9 − 0 = ▢	12 − 8 = ▢
12 − 5 = ▢	11 − 7 = ▢	10 − 9 = ▢	11 − 5 = ▢
10 − 3 = ▢	12 − 7 = ▢	12 − 9 = ▢	11 − 8 = ▢
12 − ▢ = 5	10 − ▢ = 7	9 − ▢ = 9	11 − ▢ = 3
11 − ▢ = 7	9 − ▢ = 0	11 − ▢ = 5	12 − ▢ = 9

1. Write each of the above facts which has a remainder of 3; a remainder of 9.

2. Write the facts which have a remainder of 6; of 4.

3. Write the facts which have a remainder of 8; 7; 5; 2.

Keep on the Trail

Watch the signs. Check each answer.

1.

10	28	95	30	32	47
+67	−6	−94	+54	−22	−41

2. 65 − 0 = ▢ 83 − 10 = ▢ 2 + 45 = ▢

3. 58 − 58 = ▢ 80 − 30 = ▢ 30 + 6 = ▢

4.

7	6	1	8	0	4
3	5	7	4	5	7
8	7	2	7	6	2

Naming Larger Numbers

Charles has finished reading page 100 in his book. The next page is 101 (**one hundred one**). This numeral means 100 and 1 more.

What does 102 mean? 103? 104? 105? 106? 107? 108? 109? 110?

Charles has finished page 111 (**one hundred eleven**). He has read 100 pages, and 10 pages, and 1 page.

The class will need 1 hundreds' bundle, 9 bundles of tens, and 10 cards. Use these to show what the numerals below mean. Here, you see 111 pictured with cards.

1. Do this for each numeral below. Make the picture. Write the numeral on the blackboard. Read the numeral. Tell what each digit means.

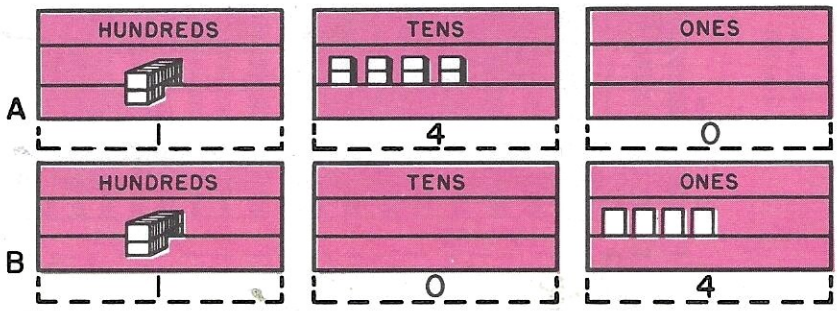
125 152 136 163 103 130 108 180 147

2. Count from 101 to 150. What number comes after 109? 119? 129? 139? 149?

3. Write the numerals from 150 to 199.

4. The next number after 199 is 200 (**two hundred**). Show 199 with the cards. Put up 1 more card. Show how to get 2 hundreds, 0 tens, and 0 ones.

5. Count by hundreds: 100, 200, 300, 400, 500, 600, 700, 800, 900. Write these numerals.



Zero as a Place Holder in Three-Place Numerals

1. Read the numeral you see pictured in the three charts in **A.** Say **one hundred forty.** This means 1 hundred, 4 tens, and no ones. To write this numeral you must write three digits. Write 140.

Without 0 in ones' place what would 140 be? (14) This shows why 0 is needed as a place holder.

2. Picture **B** shows another three-place numeral. Say only what the cards show. Say **one hundred four.** Why?

Write a digit for each of the three places. Write 104. Try to write 104 without a 0 in tens' place. (14) If you did not show tens' place, would the 1 be in hundreds' place? If 14 is changed to 104, does the 0 change the value of the 4? Does the 0 change the value of the 1?

3. In each numeral below, tell in which place 0 (the **zero**) is used as a place holder. Then read the numeral.

506 160 208 430 190 703 102 310 670

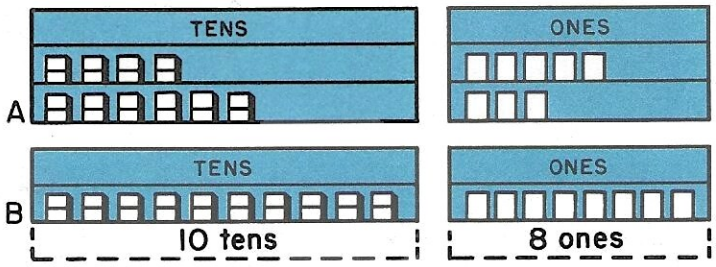
4. Read the numerals below. Tell what each digit means.

270 702 125 507 460 163 255 116 216

127 504 430 289 408 313 644 614 910

5. Write 300. What is the value of the 3? Erase one zero. What now is the value of the 3? Erase another zero. What now is the value of the 3?

45
+63

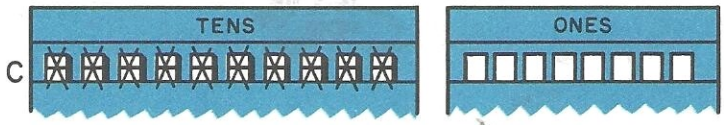


Adding Tens and Ones—Hundreds in the Sum

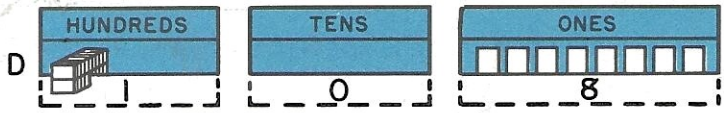
1. Begin with the ones in A. How many are 5 ones and 3 ones? See how the ones are put together in B.

2. How many are 4 tens and 6 tens in A? See how the tens are put together in B.

3. Ten tens leave the tens' holder. Take out the 10 tens, as in C. Do any tens stay in the tens' holder?



4. With the 10 tens make 1 hundreds' bundle. Now you need a hundreds' holder. Put the 1 hundred in it. See how in D. What does D show is the sum?



A. $45 = 40 + 5$
$+\ 63 = 60 + 3$
$100 + 8 = 108$

B.
$$\begin{array}{r} 45 \\ +\ 63 \\ \hline 8 \end{array}$$

Step 1: Begin with the ones.
Think: 5 ones + 3 ones = 8 ones.
Write 8 in ones' place.

$$\begin{array}{r} 45 \\ +\ 63 \\ \hline 108 \end{array}$$

Step 2: Add the tens next.
Think: 4 tens + 6 tens = 10 tens.
No tens stay. Why?
Write 0 in tens' place.

Change 10 tens to 1 hundred. Write 1 in hundreds' place. What is the sum?

325 Let's Add

Rework the first three examples as in A. Then explain how these sums are found as in B. Use form B to find the other sums. Check each answer.

1.	12	80	53	50	96	21
	97	30	72	54	32	80
	109	110	125			
2.	70	46	33	43	72	54
	42	80	96	74	50	63
3.	5	66	90	78	63	84
	74	53	16	1	65	44

Ellen's New Records

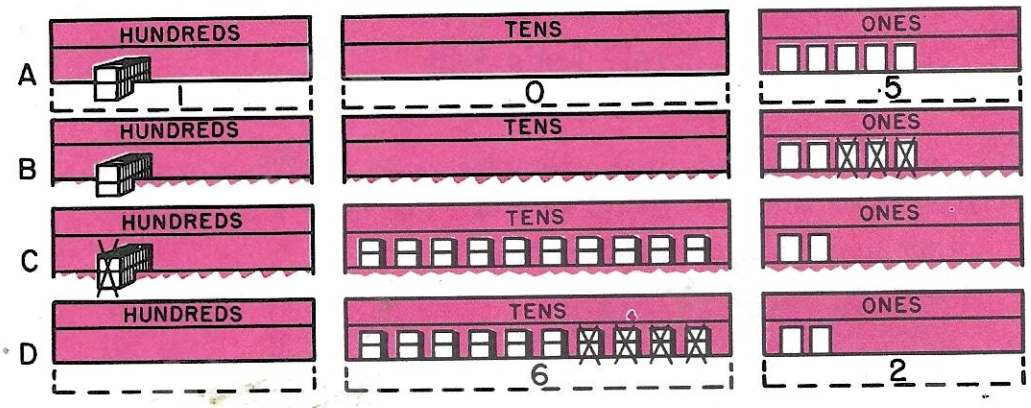
1. How many records has Ellen in all? If she plays the record in her hand, how many are left to play?

2. Ellen has 10 records in all. Six are music records. The others are story records. How many are story records?

3. "I have 4 story records now, but I am getting 5 other story records," said Ellen. How many story records will she then have in all?

4. Ellen has 6 music records and 4 story records. How many more music records than story records has she?

5. Ellen gets the new story records (problem 3). How many more story records than music records has she now?



Subtracting Tens and Ones from Larger Numbers

1. Picture **A** shows 1 hundred, no tens, and 5 ones in the holders to show 105. The example at the left asks us to take 4 tens and 3 ones away.

$$\begin{array}{r} 105 \\ -\ 43 \\ \hline \end{array}$$

2. **Begin with the ones.** Take out 3 ones. See how in **B.** How many ones are left?

3. Can you take 4 tens from the tens' holder in **B**? **Take the 1 hundred. Open it to get 10 tens.** Put the 10 tens in the tens' holder. See how in **C.**

4. Now you can take out 4 tens. See how in **D.** How many tens are left? What does **D** show is the remainder?

Now work this example without cards.

A. $105 = 100 + 5$
$-43 = 40 + 3$
$60 + 2 = \square$

B. $\begin{array}{r} 105 \\ -\ 43 \\ \hline 2 \end{array}$

Step 1: Begin with the ones.
Think: $5 - 3 = 2$.
Write 2 in ones' place.

$\begin{array}{r} {}^{0}\not{1}\ {}^{10}\not{0}\ 5 \\ -\ 43 \\ \hline 62 \end{array}$

Step 2: Subtract the tens next.
Think: There are no tens from which to subtract 4. I must get tens. Take the 1 hundred. Regroup it as 10 tens. Now I can subtract.
Write 6 in tens' place. Why are there no hundreds left? What is the remainder?

325 Let's Subtract

Tell how to find and check each of these remainders.

$\overset{0}{\not1}\overset{10}{\not0}7$	$\overset{0}{\not1}\overset{10}{\not0}9$	$\overset{0}{\not1}\overset{11}{\not1}3$	$\overset{0}{\not1}\overset{11}{\not1}8$	$\overset{0}{\not1}\overset{12}{\not2}6$	$\overset{0}{\not1}\overset{12}{\not2}0$
-23	-79	-50	-68	-34	-70
84	30	63	50	92	50

Find the remainders. Check each answer.

1. 109 − 41 = ; 127 − 67 = ; 108 − 36 = ; 119 − 42 = ; 100 − 60 = ; 117 − 76 = ; 102 − 30 =

2. 111 − 30 = ■ 125 − 80 = ■ 117 − 85 = ■

3. 109 − 94 = ■ 119 − 23 = ■ 109 − 15 = ■

4. 89 − 26 = ; 114 − 90 = ; 68 − 67 = ; 129 − 57 = ; 89 − 8 = ; 78 − 43 = ; 58 − 54 =

5. 127 − 90 = ■ 107 − 51 = ■ 106 − 63 = ■

6. 47 − 42 = ■ 129 − 70 = ■ 78 − 1 = ■

A Visit to the Farm

1. Don is watching the pigs eat. In the pen are 3 big pigs and 9 little pigs. How many pigs in all are there?

2. Sally likes the ducklings. There are 8 ducklings and 3 big ducks. How many are there altogether? How many more ducklings than big ducks are there?

3. Mother Hen is calling her 12 chicks. Four are black. The others are white. How many chicks are white?

Keep on the Trail

Watch the signs. Check each answer.

1.

56	33	20	105	96	61	124
−20	+73	+98	−43	−1	+8	−54

2. $39 - 37 = \square$ $\quad 5 + 91 = \square$ $\quad 57 + 72 = \square$

3. $52 + 4 = \square$ $\quad 119 - 75 = \square$ $\quad 69 - 26 = \square$

4. $30 + 84 = \square$ $\quad 26 + 93 = \square$ $\quad 58 - 18 = \square$

5.

49	30	51	2	129	88	128
−9	+85	−51	6	−84	+40	−90
			4			

A Thanksgiving Dinner on the Farm

1. Grace set the table. She put 4 chairs along each side of the table. She put 1 chair at each end. How many chairs in all did she need? (Use the picture.)

2. How many napkins did Grace need in all for the table? She had only 8 napkins. How many more did she need to get?

3. How many grownups are at the table? How many children? How many more grownups than children?

4. How many at the table cannot have a turkey leg?

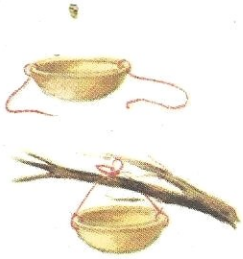
Helping Bird Friends

1. There are 4 sparrows, 2 pigeons, and 3 starlings feeding. Find them in the picture. How many birds in all are at the feeding tray?

2. How many birds are at the feeding tray? How many birds are flying down to the feeding tray? Then how many birds in all will there be?

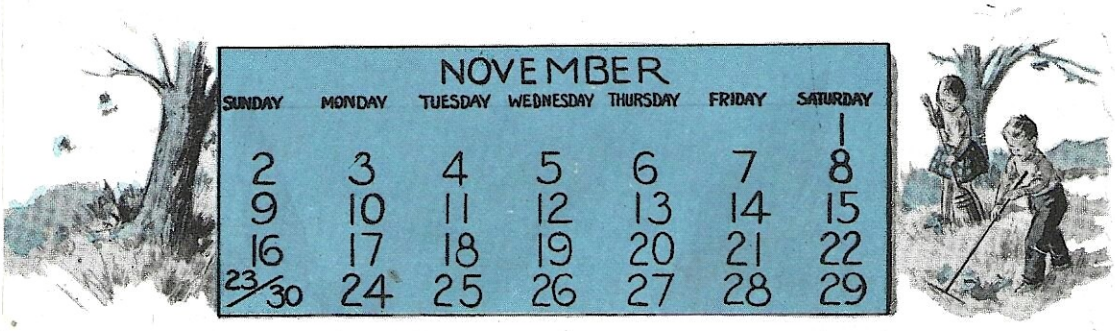
3. There are 11 birds at the feeding tray. Nine birds fly away. How many birds will be left?

4. You can make food baskets for the birds. Save empty grapefruit halves. Fill them with seeds, bread, and bits of fat. Hang them on branches of trees. Jim and his friends hung 6 food baskets. Draw a picture of them. How many whole grapefruits did they need?



5. Make problems about feeding birds for these number sentences:

a. $5 + \square = 11$
b. $12 - 4 = \square$
c. $3 + 9 = \square$
d. $\square - 8 = 3$
e. $9 + 2 = \square$
f. $12 - 7 = \square$


NOVEMBER
SUNDAY MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY
1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23/30 24 25 26 27 28 29

The Months and Seasons

In some places the leaves drop in the fall. What season does the picture show?

1. What month does the calendar tell you it is? On this calendar, name the days of the week. How many? Which is the first day of the week on a calendar? Which is the last day of the week? How many days are in 1 week?

2. Point to each numeral as your teacher tells how we read numerals on a calendar. Say each one after her.

3. Your teacher will say one of the dates on the above calendar. Find the date. Tell on what day of the week it comes. Do the same for other dates.

4. On what dates do the Tuesdays come on this calendar? the Thursdays? the Saturdays? the Fridays? the Mondays?

5. What holiday comes in November?

6. How many days are in November? Find out from a calendar how many days are in each of the months.

7. Name the months of the year in their order. Which is the first month? Which is the last month?

8. The picture shows it is fall. Name the other seasons.

9. Answer questions 3 and 4, using your room calendar.

Do You Know How?

There are page numerals at the right of each group. Turn to these pages if you need help.

Addition

1. $\begin{array}{r} 52 \\ +47 \\ \hline \end{array}$ $\begin{array}{r} 20 \\ +60 \\ \hline \end{array}$ $\begin{array}{r} 55 \\ +30 \\ \hline \end{array}$ (50) (53)

2. $45 + 3 = \square$ (64)
   $4 + 32 = \square$
   $50 + 9 = \square$

3. $32 + 85 = \square$ (76)
   $47 + 61 = \square$
   $94 + 35 = \square$

4. $\begin{array}{r} 4 \\ 2 \\ \underline{3} \end{array}$ $\begin{array}{r} 4 \\ 8 \\ \underline{3} \end{array}$ $\begin{array}{r} 6 \\ 5 \\ \underline{5} \end{array}$ (37) (70)

Subtraction

1. $\begin{array}{r} 53 \\ -41 \\ \hline \end{array}$ $\begin{array}{r} 86 \\ -56 \\ \hline \end{array}$ $\begin{array}{r} 97 \\ -80 \\ \hline \end{array}$ $\begin{array}{r} 86 \\ -65 \\ \hline \end{array}$ $\begin{array}{r} 87 \\ -34 \\ \hline \end{array}$ $\begin{array}{r} 83 \\ -43 \\ \hline \end{array}$ (54) (55)

2. $24 - 21 = \square$ $19 - 13 = \square$ $60 - 60 = \square$ (58)

3. $98 - 98 = \square$ $45 - 41 = \square$ $78 - 71 = \square$ (58)

4. $\begin{array}{r} 89 \\ -1 \\ \hline \end{array}$ $\begin{array}{r} 49 \\ -7 \\ \hline \end{array}$ $\begin{array}{r} 98 \\ -7 \\ \hline \end{array}$ $\begin{array}{r} 35 \\ -4 \\ \hline \end{array}$ $\begin{array}{r} 75 \\ -5 \\ \hline \end{array}$ $\begin{array}{r} 59 \\ -6 \\ \hline \end{array}$ (59)

5. $108 - 10 = \square$ $126 - 94 = \square$ $108 - 82 = \square$ (78) (79)

6. $117 - 91 = \square$ $119 - 85 = \square$ $126 - 40 = \square$ (78) (79)

7. $135 - 72 = \square$ $106 - 64 = \square$ $117 - 33 = \square$ (78) (79)

For Those Who Do Not Need More Practice

When is your next birthday? Make a calendar for that month. Mark your birthday in red. Name any holidays in your birthday month.

Progress Test

Watch the signs. Check your answers.

1. $54 + 35 = \square$ (50)

2. $64 - 41 = \square$ (54)

3. $40 + 86 = \square$ (53)

4. $97 - 70 = \square$ (55)

5. $5 + 54 = \square$ (64)

6. $75 - 55 = \square$ (54)

7. $40 + 8 = \square$ (64)

8. $69 - 65 = \square$ (58)

9. $83 + 46 = \square$ (76)

10. $128 - 45 = \square$ (78)

11. $79 - 5 = \square$ (59)

12. $64 - 4 = \square$ (59)

13. $3+1+8 = \square$ (37)

14. $4+7+5 = \square$ (70)

15. $2+9+3 = \square$ (70)

16. In which numeral below is zero written in tens' place? (75)

a. 642 b. 310 c. 905 d. 820

17. Write the two-place numeral with 0 in ones' place which names the largest number. (47)

18. Write the three-place numeral which names the smallest number. (74)

19. In the number sentence, $34 - \square = 12$, what is the missing numeral? (24) (54)

20. In the number sentence, $8 + \square = 12$, what is the missing numeral? (24) (66)

Play a Game with Words

Show that you know what these words mean. Use the three ways given on page 39.

1. checking work
2. count
3. hundreds
4. Law of Grouping for Addition
5. ones' place
6. related number facts
7. remainder
8. subtract
9. sum
10. ten ones
11. ten 10's
12. two-place numeral
13. zero
14. digit
15. addend

Checking Up on Understandings

Tommy Uses the Law of Grouping and the Law of Order for Addition to Make Adding Easy

Tommy discovered a way to use the Law of Grouping for Addition to help him when adding three or more numbers. Tommy thought, "Adding 10 and another number is easy." So Tommy groups numbers to make a ten whenever he can. See how he uses the Law of Grouping.

1. $2 + 6 + 4 = 2 + (6 + 4) = 2 + 10 = 12$

Tommy thinks it is easier to add $2 + (6 + 4)$ than to add $(2 + 6) + 4$. Do you agree? Tell why.

2. $7 + 3 + 5 = (7 + 3) + 5 = 10 + 5 =$ ▩

3. $4 + 5 + 5 + 2 = 4 + (5+5) + 2 = 4 + 10 + 2 =$ ▩

Sometimes Tommy uses both the Law of Order and the Law of Grouping. First he changes the order of the addends. Then he groups to make a ten.

4. $1 + 3 + 9 = 1 + 9 + 3 = (1+9) + 3 = 10 + 3 =$ ▩

5. $8 + 6 + 2 = 8 + 2 + 6 = (8+2) + 6 = 10 + 6 =$ ▩

Group as Tommy did to make a ten in examples 6 to 11.

6. $3 + 8 + 2 =$ ▩

7. $2 + 7 + 3 =$ ▩

8. $3 + 5 + 5 + 2 =$ ▩

9. $6 + 4 + 3 =$ ▩

10. $4 + 2 + 8 =$ ▩

11. $4 + 9 + 1 + 3 =$ ▩

In examples 12 to 19 below first change the order of the addends. Then group to make a ten.

12. $5 + 8 + 5 =$ ▩

13. $2 + 6 + 8 =$ ▩

14. $4 + 9 + 6 =$ ▩

15. $1 + 7 + 9 =$ ▩

16. $2 + 4 + 8 + 6 =$ ▩

17. $4 + 5 + 2 + 5 =$ ▩

18. $3 + 4 + 7 + 4 =$ ▩

19. $5 + 7 + 1 + 3 =$ ▩

Chapter 3

Mary's New Dime Bank

Mary's father gave her the dime bank you see on page 86. Mary can put only dimes in this dime bank. Below you see the money Mary earned in two days.

1. A shows money earned the first day. How much?

A

2. B shows money earned the second day. How much?

B

3. How many pennies did she get the first day? the second day? in all in the two days?

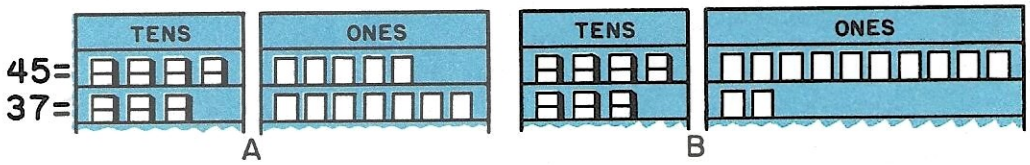
4. To help Mary get more dimes her father changed her 12 pennies to:⟶ Show this is as much money as the 12 pennies.

5. In A and B Mary had ? pennies in all? After she changed her money she had ? pennies?

6. In A and B Mary had ? dimes in all? After she changed her money she had ? dimes for her dime bank?

C

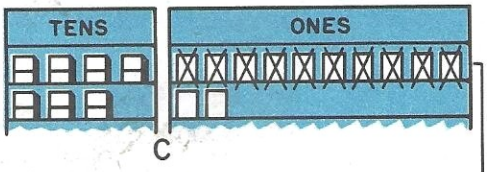
7. Show that picture C shows how much money she had in all. Now you are ready for page 88.



Too Many Ones

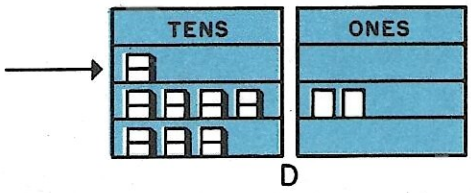
With bundles of tens and single cards show $\begin{array}{r} 45 \\ +37 \end{array}$. See how in picture A above.

Begin with the ones' holder in A. Think: 5 ones and 7 ones are 12 ones in all. See in B that 12 ones are 10 ones and 2 ones. 12 ones cannot all stay in ones' place. 10 ones must go. Take out the 10 ones. See how in C.



How many ones stay in the ones' holder? Put the 10 ones together. They make 1 ten.

See in D below where to put the 1 tens' bundle.



Put the 1 tens' bundle in tens' holder, as in D. Add the tens' bundles next. 1 ten and 4 tens are 5 tens. 5 tens and 3 tens are 8 tens. What sum does this picture show?

Show the work in the examples below with cards.

$37 + 55 = 92$	$86 + 36 = 122$	$64 + 37 =$ ▣
$48 + 24 =$ ▣	$46 + 74 =$ ▣	$53 + 47 =$ ▣

326 You Carry a Ten

A.
$$\begin{array}{r} 45 = 40 + 5 \\ +\,37 = 30 + 7 \\ \hline 70 + 12 \end{array} \qquad \begin{array}{l} = 70 + (10 + 2) \\ = (70 + 10) + 2 \\ = \quad 80 \quad + 2 = 82 \end{array}$$

B.
$$\begin{array}{r} 45 \\ +\,37 \\ \hline 2 \end{array}$$

Step 1: Add the ones first. See 5 + 7. Think twelve.

Only 2 of the 12 ones stay. Write 2 in ones' place. Join the 10 ones to make 1 ten. Now go on to step 2.

$$\begin{array}{r} {\scriptstyle 1} \\ 45 \\ +\,37 \\ \hline 2 \end{array}$$

Step 2: Carry the 1 ten. See where 1 is written.

$$\begin{array}{r} {\scriptstyle 1} \\ 45 \\ +\,37 \\ \hline 82 \end{array}$$

Step 3: Add the 1 ten you carry to 4 tens. Think 1 ten and 4 tens are 5 tens. Then think: 5 tens and 3 tens are 8 tens. Write 8 in tens' place.

Find the sums below. Work the first three examples as in A. Work the other examples as in B. Check each answer.

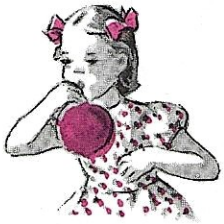
1.
$$\begin{array}{rrrrrrr} 34 & 63 & 23 & 45 & 68 & 66 & 12 \\ \underline{38} & \underline{57} & \underline{69} & \underline{37} & \underline{14} & \underline{46} & \underline{59} \end{array}$$

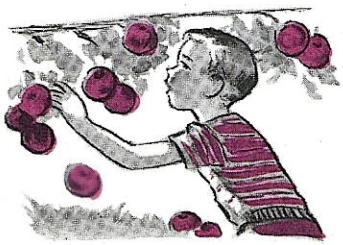
2. $65 + 27 = \square$ $\quad 79 + 23 = \square$ $\quad 33 + 78 = \square$

3. $24 + 98 = \square$ $\quad 63 + 57 = \square$ $\quad 51 + 49 = \square$

4. In one bus there were 38 children. In another bus there were 34 children. How many children rode in the two buses?

5. There are 23 boys and 19 girls in Ann's schoolroom. How many children in all are in her schoolroom?





Problems in Pictures

1. Tony opened a box of candy. In it were 12 pieces. The first piece is in his mouth. Why are there not 11 pieces left in the box? How many pieces are left in the box?

2. Mitzi blew her new balloon 4 times. It was not big enough. She blew 5 times more. It still was not big enough. She blew 3 times more. Then, POP, it burst! How many times did Mitzi blow in all before the balloon burst?

Write number sentences for each problem below.

3. Otto saw 11 apples on a branch. Three of the apples fell to the ground. How many apples were left on the branch?

4. Mother put 12 cookies on plate **A**. How many cookies are now on the plate? How many cookies have been taken?

5. Betty had put 11 cookies on plate **B**. How many cookies have been taken?

6. Jane needs 12 cookies. She has only those you see on plate **C**. How many more cookies does she need?

7. How many cookies do you see on plate **D**? Suppose Tom puts 6 more cookies on the plate. How many cookies in all will there be?

Keep on the Trail

1. $\begin{array}{rrrrrrr} 54 & 128 & 82 & 115 & 122 & 84 & 81 \\ \underline{-20} & \underline{-97} & \underline{+3} & \underline{-83} & \underline{-80} & \underline{-82} & \underline{+13} \end{array}$

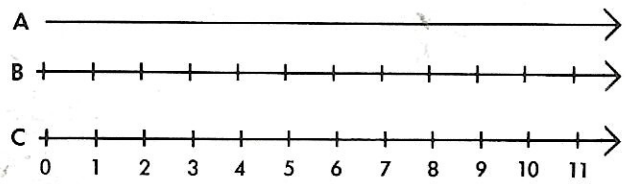
2. $\begin{array}{rrrrrrr} 108 & 76 & 34 & 56 & 127 & 9 & 55 \\ \underline{-72} & \underline{+51} & \underline{+90} & \underline{+56} & \underline{-72} & \underline{+30} & \underline{+7} \end{array}$

3. $100-60=\square$ $89-57=\square$ $69-8=\square$ $97-91=\square$

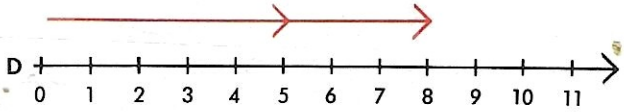
4. $3+5+4=\square$ $4+8+4=\square$ $7+4+6=\square$

What Is a Number Line?

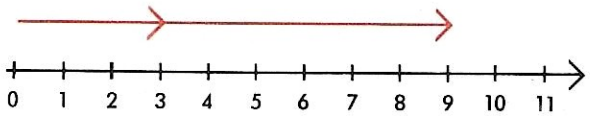
1. Below are some pictures of number lines. Listen carefully to your teacher as she explains each picture to you. Begin with picture A.



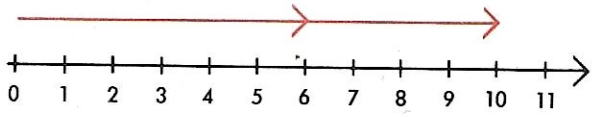
2. See in picture D below how the two arrows above the number line show that the sum of 5 and 3 is 8.



3. How do we show $3 + 6 = 9$ on a number line?



4. How do we show $6 + 4 = 10$ on a number line?



326 Adding Ones to Tens and Ones with Carrying

A.
$$\begin{array}{rcl} 45 & = & 40 + 5 \\ +7 & = & \underline{\qquad\quad 7} \\ & & 40 + 12 \end{array} \qquad \begin{array}{l} = 40 + (10 + 2) \\ = (40 + 10) + 2 \\ = \quad 50 \quad + 2 = 52 \end{array}$$

B.

$$\begin{array}{r} {\scriptstyle 1} \\ 45 \\ +\,7 \\ \hline 52 \end{array}$$

Step 1: Add the ones first.

Think: 5 + 7 = 12. Regroup the 12 ones as 1 ten and 2 ones. How? Write 2 in ones' place. Why? Carry the 1 ten.

Step 2: Add the tens next.

See that instead of 4 tens there are 5 tens. Why? Write 5 in tens' place. What is the sum?

For those who need more help:

Show how to find 45 + 7 with bundles of tens and single cards.

Work the first three examples as in A. Explain how the sums were found in the last four examples.

41	69	25	38	8	2	4
9	3	6	2	74	48	17
50	72	31	40	82	50	21

Work each example as in B. Check each answer.

1.	78	7	13	4	52	3	84
	4	43	9	38	9	28	6
2.	28	56	23	5	6	69	33
	63	5	9	87	34	1	72

3. $55+6=\square$ $\quad 8+4+5=\square$ $\quad 78+4=\square$ $\quad 3+9+6=\square$

Getting Ready for the Next New Step in Subtraction

Six boys need 6 pennies to put in a gum machine. Then each boy can buy a stick of gum.

1. The boys have this money. What coins have they?

2. How much money have they in all? Discover a way they could get 6 pennies from the 12 cents.

3. They went to a store. They asked a clerk to change the dime for 10 pennies.

What does the above picture show they have done?

4. How many pennies do they now have in all?

Show this is the same amount of money the boys had at first.

5. If the boys put 6 of the pennies in the machine, how many pennies will be left? $12 - 6 = \square$

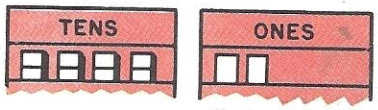
6. You have:

You want to spend 8 pennies. What would you do? How many dimes and how many pennies would be left? Now you are ready for page 94.

Changing a Ten to Ones

Use bundles of tens and single cards.
Show how to find:

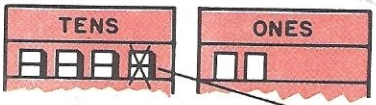
$$\begin{array}{r} 42 \\ -15 \\ \hline \end{array}$$



Show 4 tens and 2 ones.

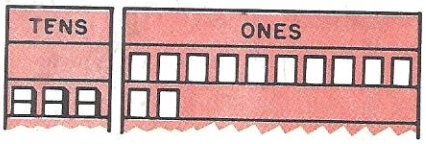
From these cards we need to take out 1 ten and 5 ones.

Begin with the ones' card holder. You cannot take 5 cards from the 2 cards in the ones' holder.



Go to tens' place. Take a tens' bundle. Open it.

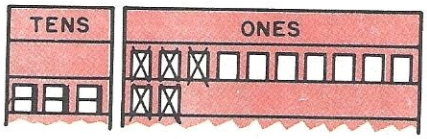
How many ones are in 1 ten?



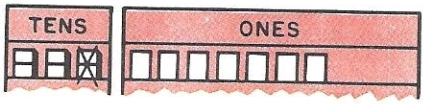
Put the 10 ones in ones' place. There are how many ones now? 10 + 2 is how many?

Now you can take the 5 ones from the 12 ones as you see below. How many ones are left?

Go to the tens' holder. Why are there only 3 tens?



Take the 1 ten from the 3 tens. How many tens are left?



What remainder does the picture show?

Subtracting When We Need to Regroup a Ten as Ones

A.
$$\begin{array}{r} 42 = 40 + 2 = 30 + 12 \\ -\,15 = 10 + 5 = 10 + \;5 \\ \hline 20 + \;7 = 27 \end{array}$$

B. **Step 1: Begin with ones.** Think: I cannot take 5 ones from 2 ones. I must take 1 ten from the 4 tens. Then I regroup this 1 ten as 10 ones. This leaves 3 tens in tens' place.

$$\begin{array}{r} {}^{3}\cancel{4}\;{}^{12}\cancel{2} \\ -\,1\;5 \\ \hline 7 \end{array}$$

You know that 10 ones and 2 ones are 12 ones. Think: 12 − 5 = 7.
Write 7 in ones' place as shown.

Step 2: Subtract the tens next. There are 3 tens now. Why? Think: 3 tens − 1 ten = 2 tens.
Write 2 in tens' place as shown.

$$\begin{array}{r} {}^{3}\cancel{4}\;{}^{12}\cancel{2} \\ -\,1\;5 \\ \hline 2\;7 \end{array}$$

To check, what numbers do you add?
Do you compare addends or sums to see if your work checks?

$$\begin{array}{r} 4\;2 \\ -\,1\;5 \\ \hline 2\;7 \end{array} \qquad \begin{array}{r} 1\;5 \\ +\,2\;7 \\ \hline 4\;2 \end{array}$$

Work the first three examples as in A. Then finish the other examples as in B. Check your work.

1.

62	60	52	81	71	90	82
14	49	33	37	26	54	46
48	11	19				

2. $90 - 75 = \square$ $\quad 71 - 44 = \square$ $\quad 90 - 58 = \square$ $\quad 30 - 17 = \square$

3. $72 - 19 = \square$ $\quad 92 - 38 = \square$ $\quad 52 - 17 = \square$ $\quad 40 - 16 = \square$

326 Are There Enough Ones?

$\begin{array}{r} 79 \\ -42 \\ \hline \end{array}$ Are there enough ones to subtract 2 from 9? You do not need more ones. You do not regroup 1 ten as 10 ones.

$\begin{array}{r} 72 \\ -49 \\ \hline \end{array}$ $\begin{array}{r} {}^{6}\cancel{7}\,{}^{12}\cancel{2} \\ -49 \\ \hline \end{array}$ Are there enough ones to subtract 9 from 2? You need to take 1 of the tens. Regroup it as 10 ones. There are now 12 ones. Subtract 9 from 12.

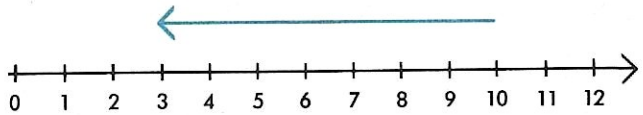
Complete the example.

Keep on the Trail

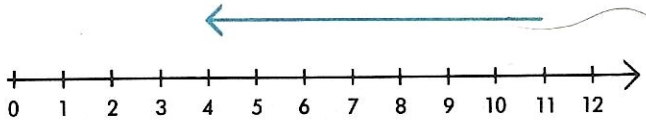
1.	109	81	121	36	60	42	99
	-50	-34	-40	-32	-34	-2	-12
2.	18	70	7	8	2	61	20
	$+24$	$+47$	5	$+70$	4	$+7$	$+76$
			5		5		

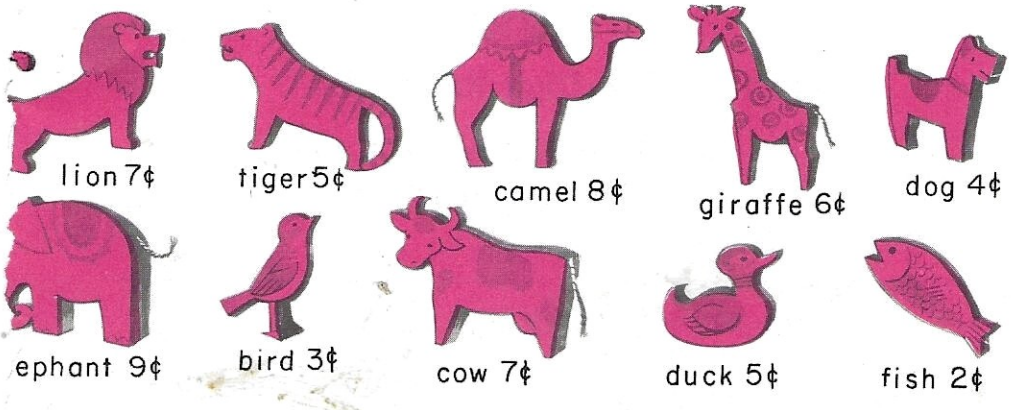
Showing Subtraction on a Number Line

1. See below how to show $10 - 7 = 3$ on a number line. Begin at point 0. Let your eye move to the right as you count 10 spaces to get to 10. Stop. You have found the sum on the number line. To take the addend 7 away, an arrow points to the left to show we count back 7 spaces to take away 7 from 10. From 0 to 3 shows 3 spaces are left.



2. How does the number line below show that $11 - 7 = 4$?





Wooden Toys for Sale

1. See the list of toys each child bought at the school fair. The picture shows each kind of toy and what it sold for. Find out how much each child paid.

Joe		Ann	Sue	Ned	Jane
lion	7¢	duck	dog	tiger	dog
tiger	5¢	giraffe	camel	cow	cow
giraffe	6¢	dog	fish	dog	duck

Betty	Jerry	Alice	Sam	Elsie
tiger	elephant	duck	elephant	lion
fish	bird	dog	bird	dog
duck	fish	bird	tiger	fish
dog	tiger	cow	fish	giraffe

2. Find a set of 3 toys you can buy for a total of 15¢; 16¢; 17¢; 18¢; 19¢.

3. Replace the frames. On your paper put a ring around the examples in which you can group to make a ten.

a. $3 + 9 + 2 = \square$
b. $6 + 6 + \square = 17$
c. $3 + 8 + 4 = \square$
d. $5 + 7 + \square = 16$
e. $5 + 5 + \square = 17$
f. $9 + 3 + 7 = \square$
g. $8 + 4 + 6 = \square$
h. $\square + 5 + 5 = 14$

327 A One-Digit Remainder

A. $42 = 40 + 2 = 30 + 12$
$-39 = 30 + 9 = 30 + 9$
3

Step 1: Begin with ones.

B.
$$\begin{array}{r} {\scriptstyle 3\ 12} \\ \not{4}\ \not{2} \\ -3\ 9 \\ \hline 3 \end{array}$$

Think: I cannot take 9 from 2. I must take 1 ten from 4 tens and regroup it as 10 ones. Why are there now 12 ones? Think: 12 − 9 = 3.

Write 3 in ones' place.

Step 2: Subtract the tens next.

$$\begin{array}{r} {\scriptstyle 3\ 12} \\ \not{4}\ \not{2} \\ -3\ 9 \\ \hline 3 \end{array}$$

See that instead of 4 tens there are 3 tens. Why? Think: 3 tens − 3 tens = 0 tens.

Do not write zero in tens' place in the remainder when there are no hundreds to subtract. We do not need zero as a place holder in this example. Why not? What is the remainder?

For those who need more help:

Show the work in the above example with bundles of tens and single cards.

Work the first three examples as in A. Explain how to work the last four examples as in B.

1.	90	72	40	21	82	60	51
	89	68	34	12	79	57	44
	1	4	6	9	3	3	7

Find the remainders as in B. Check each answer.

2. $21 - 19 = \square$ $\quad 90 - 86 = \square$ $\quad 51 - 43 = \square$ $\quad 30 - 28 = \square$

3. $81 - 78 = \square$ $\quad 42 - 33 = \square$ $\quad 30 - 21 = \square$ $\quad 61 - 26 = \square$

4.	60	129	60	39	72	93	95
	22	43	53	5	66	60	90

327 Subtracting—Not Enough Ones

A.
$$\begin{array}{rrrrrrr} 42 & = & 40 & + & 2 & = & 30 + 12 \\ -\,3 & = & & & 3 & = & \quad 3 \\ \hline & & & & & & 30 + 9 = 39 \end{array}$$

B.

$$\begin{array}{r} {}^{3}\not{4}\,{}^{12}\not{2} \\ -\,3 \\ \hline 9 \end{array}$$

Step 1: Begin with ones.

Think: I cannot take 3 from 2. I must take 1 ten from the 4 tens and regroup it as 10 ones. Why are there now 12 ones? 12 − 3 = 9. Write 9 in ones' place.

$$\begin{array}{r} {}^{3}\not{4}\,{}^{12}\not{2} \\ -\,3 \\ \hline 39 \end{array}$$

Step 2: Subtract the tens next.

Instead of 4 tens there are 3 tens. Why? There are no tens to subtract from 3 tens. Write 3 in tens' place. What is the remainder? Why must the remainder be less than 40?

For those who need more help:

Show how to subtract in the above example with bundles of tens and single cards.

Work the first three examples as in A. Explain how to work the last four examples as in B.

1.	31	90	52	80	71	42	60
	3	4	9	7	9	8	9
	28	86	43	73	62	34	51

Find the remainders as in B. Check each answer.

2.	21	52	61	42	80	30	70
	8	6	5	4	3	8	5
3.	82	91	117	21	92	72	80
	77	56	70	4	3	65	6

Keep on the Trail

Divide the class into two teams. The team with the most perfect papers wins. Check your work to find and correct any errors you may have made.

An Addition Contest

1. $21+8=\square$ $8+24=\square$ $68+3=\square$ $68+12=\square$

2. $74+54=\square$ $70+28=\square$ $54+5=\square$ $43+19=\square$

3.

52	4	77	59	47	92	75
71	78	13	2	44	6	6

4.

6	2	6	4	$6+5+1=\square$
3	5	6	7	$5+5+6=\square$
3	4	4	5	$4+7+2=\square$

A Subtraction Contest

1.

104	81	78	61	70	95	96
32	44	70	56	8	4	10

2. $120-80=\square$ $62-6=\square$ $91-89=\square$ $97-6=\square$

3. $36-36=\square$ $92-69=\square$ $93-72=\square$ $52-8=\square$

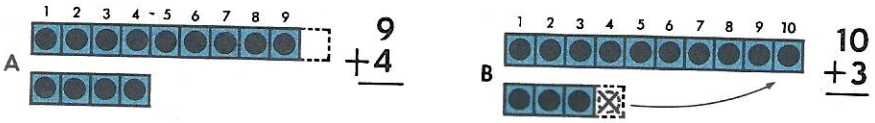
4.

119	50	39	29	80	52	84
23	46	4	20	69	3	10

5. $129-55=\square$ $30-7=\square$ $87-50=\square$ $87-5=\square$

6. $71-55=\square$ $70-65=\square$ $19-19=\square$ $64-64=\square$

How many perfect papers did each team have?



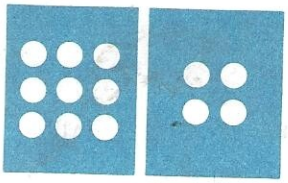
Related Number Facts about Thirteen

1. Pictures A and B above will help you to see how the Law of Grouping helps you to find the sum for 9 + 4.

$$\begin{aligned} 9 + 4 &= 9 + (1 + 3) \\ &= (9 + 1) + 3 \\ &= 10 + 3 = \square \end{aligned}$$

2. The Law of Order can help you to remember 4 + 9. 9 + 4 = 4 + 9. So, 4 + 9 is also ☐.

3. Say the four related number facts below. Point to or cover the groups of disks as you say each fact. To remember the subtraction facts, think: We begin with the sum. We take away one addend. The remainder is the other addend.



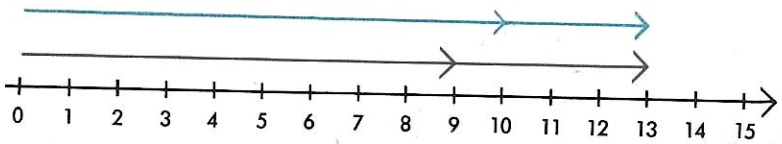
9 + 4 = 13 13 − 4 = 9

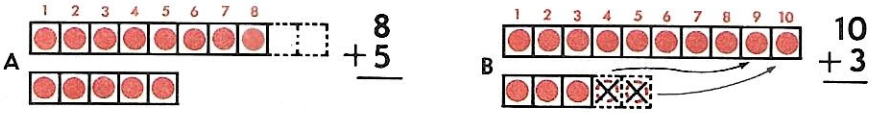
4 + 9 = 13 13 − 9 = 4

4. On paper write the number fact that matches each number sentence below.

9 + 4 = ☐	☐ + 8 = 10	7 + 5 = ☐	4 + ☐ = 12
☐ = 6 + 5	3 + 9 = ☐	7 + ☐ = 11	6 + 6 = ☐
☐ + 5 = 11	9 + ☐ = 12	3 + 8 = ☐	☐ + 9 = 13
13 − 9 = ☐	12 − 8 = ☐	☐ − 6 = 6	☐ = 9 + 3
☐ − 4 = 9	☐ − 2 = 9	12 − 6 = ☐	12 − ☐ = 8
12 − 7 = ☐	10 − ☐ = 3	11 − ☐ = 3	☐ − 4 = 9

5. Tell how the number line shows 9 + 4 = 10 + 3.





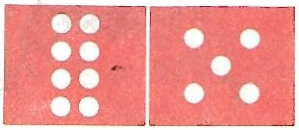
Other Related Facts about Thirteen

1. Pictures **A** and **B** above will help you to see how the Law of Grouping helps you to find the sum for 8 + 5.

$$\begin{aligned} 8 + 5 &= 8 + (2 + 3) \\ &= (8 + 2) + 3 \\ &= \quad 10 \quad + \quad 3 = \square \end{aligned}$$

2. The Law of Order can help you to remember 5 + 8. 8 + 5 = 5 + 8. So, 5 + 8 is also ▣.

3. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. To help you to remember the subtraction facts, think: We begin with the sum. We take away one addend. The remainder is the other addend.



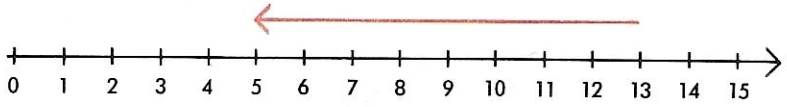
$8 + 5 = 13$ $\quad 13 - 5 = 8$

$5 + 8 = 13$ $\quad 13 - 8 = 5$

4. On paper, write the number fact that matches each number sentence below.

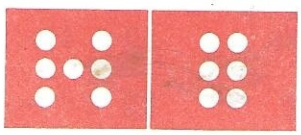
$8 + 5 = \square$	$\square + 4 = 10$	$9 + 4 = \square$	$\square - 4 = 7$
$5 + \square = 13$	$4 + 9 = \square$	$\square + 7 = 12$	$8 + 4 = \square$
$\square + 5 = 12$	$5 + 6 = \square$	$\square - 5 = 7$	$8 + 2 = \square$
$13 - \square = 8$	$\square - 6 = 4$	$13 - \square = 4$	$11 - \square = 7$
$\square - 8 = 5$	$11 - 9 = \square$	$12 - 5 = \square$	$\square - 9 = 4$
$12 - 9 = \square$	$\square - 5 = 8$	$13 - \square = 5$	$10 - \square = 9$

5. How does the number line below show 13 − 8 = 5?



6. How are the 13 disks grouped below?

7. Say the four related number facts with their answers printed below. Point to or cover the groups of disks as you say each fact. How can the Law of Order help you to remember 7 + 6 and 6 + 7?



$7 + 6 = 13$ $\quad 13 - 6 = 7$

$6 + 7 = 13$ $\quad 13 - 7 = 6$

8. Show that in subtraction you know the sum and one addend. You subtract to find the missing addend.

9. Use the Law of Grouping to help you find the sum of 7 and 6; the sum of 6 and 7.

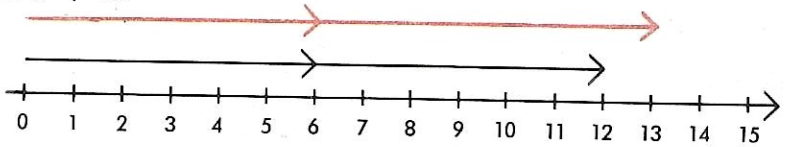
a. $7 + 6 = 7 + (3 + 3)$
$= (7 + 3) + 3$
$= 10 + 3 = \square$

b. $6 + 7 = 6 + (4 + 3)$
$= (6 + 4) + 3$
$= 10 + 3 = \square$

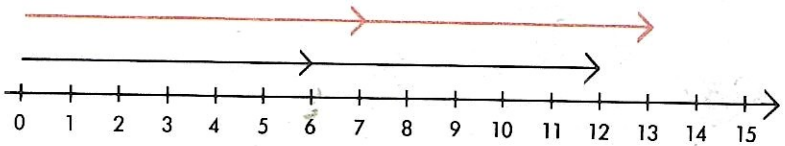
10. On paper write the number fact that matches each number sentence.

$7 + 6 = \square$	$\square + 5 = 13$	$\square - 4 = 6$	$8 + 3 = \square$
$6 + \square = 13$	$5 + 8 = \square$	$9 + 3 = \square$	$9 + \square = 13$
$4 + \square = 13$	$7 + \square = 13$	$\square - 9 = 2$	$\square + 7 = 13$
$13 - 7 = \square$	$\square - 4 = 9$	$11 - 5 = \square$	$\square - 7 = 6$
$\square - 6 = 7$	$13 - 9 = \square$	$\square - 5 = 8$	$10 - 4 = \square$
$10 - 2 = \square$	$12 - 3 = \square$	$13 - \square = 7$	$\square - 3 = 7$

11. Tell how this number line shows that 6 + 7 is 1 more than 6 + 6.



12. Tell how this number line shows that 7 + 6 is 1 more than 6 + 6.



Keep on the Trail

Watch the signs. Check your answers.

1. $\begin{array}{r} 87 \\ -20 \end{array}$ $\begin{array}{r} 46 \\ +53 \end{array}$ $\begin{array}{r} 17 \\ +76 \end{array}$ $\begin{array}{r} 57 \\ -37 \end{array}$ $\begin{array}{r} 30 \\ +60 \end{array}$ $\begin{array}{r} 137 \\ -43 \end{array}$ $\begin{array}{r} 73 \\ -27 \end{array}$

2. $\square - 27 = 92$ $\square + 50 = 130$ $59 + 4 = \square$

3. $53 + 75 = \square$ $99 - 42 = \square$ $\square + 8 = 53$

4. $\begin{array}{r} 5 \\ 2 \\ 6 \end{array}$ $\begin{array}{r} 6 \\ +24 \end{array}$ $\begin{array}{r} 62 \\ -58 \end{array}$ $\begin{array}{r} 43 \\ -9 \end{array}$ $\begin{array}{r} 4 \\ 5 \\ 4 \end{array}$ $\begin{array}{r} 73 \\ -66 \end{array}$ $\begin{array}{r} 93 \\ -39 \end{array}$

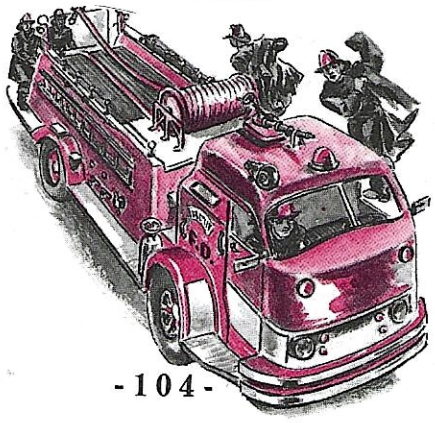
Our Friends the Firemen

1. There were 13 firemen at a fire. One truck with 5 firemen left. How many firemen stayed?

2. One week there were 4 fires. The next week there were 8 fires. How many fires were there in the two weeks?

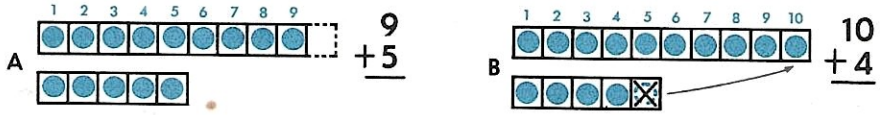
3. On the first truck were 4 firemen. On the second truck were 5 firemen. On the third truck were 4 firemen. How many firemen were on the three trucks?

4. At one fire there were 13 firemen. At another fire only 9 men were needed. How many more men were needed at the first fire?



5. The firemen reached a fire at 9:00 o'clock. It took one hour and a half to put out the fire. At what time was the fire out?

6. There were 73 firemen in all. If 46 men were on duty, how many men were not on duty?



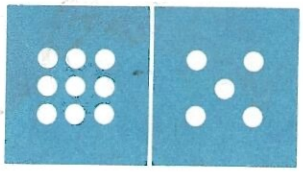
Related Number Facts about Fourteen

1. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of 9 + 5.

$$\begin{aligned} 9 + 5 &= 9 + (1 + 4) \\ &= (9 + 1) + 4 \\ &= \quad 10 \quad + \quad 4 = \blacksquare \end{aligned}$$

2. The Law of Order for Addition can help you to remember 5 + 9. 9 + 5 = 5 + 9. So 5 + 9 is also ■.

3. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. To help you remember the subtraction facts, think: We begin with the sum. We take away one of the addends. The remainder is the other addend.



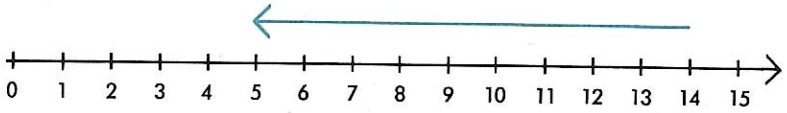
$9 + 5 = 14$ $\quad$ $14 - 5 = 9$

$5 + 9 = 14$ $\quad$ $14 - 9 = 5$

4. On paper write the number fact that matches each number sentence.

$9 + 5 = \blacksquare$	$7 + 6 = \blacksquare$	$5 + 8 = \blacksquare$	$\blacksquare - 6 = 6$
$\blacksquare + 9 = 14$	$\blacksquare + 7 = 13$	$\blacksquare - 9 = 4$	$5 + 9 = \blacksquare$
$\blacksquare - 7 = 5$	$5 + 8 = \blacksquare$	$8 + \blacksquare = 13$	$\blacksquare + 5 = 14$
$14 - \blacksquare = 9$	$13 - \blacksquare = 9$	$\blacksquare - 7 = 4$	$14 - \blacksquare = 9$
$14 - 5 = \blacksquare$	$\blacksquare - 4 = 8$	$14 - 5 = \blacksquare$	$\blacksquare - 9 = 4$
$\blacksquare - 5 = 8$	$11 - 6 = \blacksquare$	$13 - \blacksquare = 6$	$10 - \blacksquare = 3$

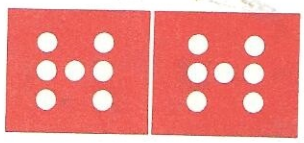
5. Tell how this number line shows that 14 − 9 = 5.



Other Related Facts about Fourteen

1. How are the 14 disks below grouped?

2. Say the two related number facts with their answers printed below. Point to or cover the groups of disks as you say each fact. Show that in subtraction you begin with the sum. You take away one of the addends. What is left is the other addend.



$7 + 7 = 14$

$14 - 7 = 7$

3. Cover one group of 7 disks. Compare the number of disks you covered with the number you see. How does this show that 14 is 2 groups of 7?

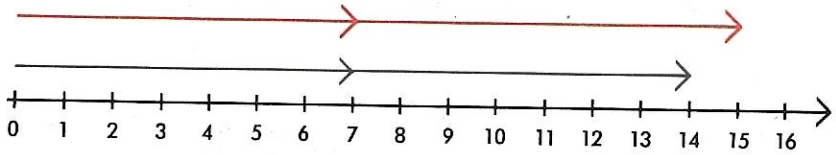
Use the Law of Grouping to help you to find the sum of 7 + 7.

$$7 + 7 = 7 + (3 + \triangle)$$
$$= (7 + 3) + \triangle$$
$$= 10 + \triangle = \square$$

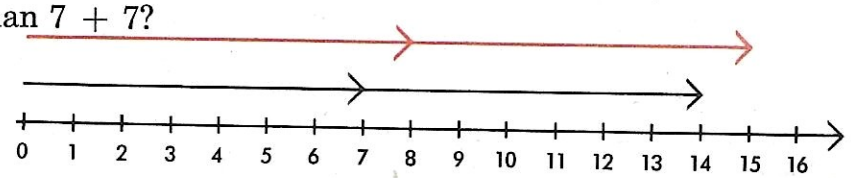
4. Solve each number sentence.

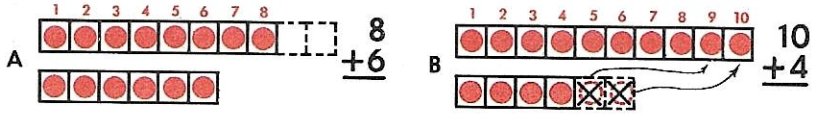
$7 + \square = 14$	$\square - 9 = 1$	$5 + 9 = \square$	$7 + 6 = \square$
$\square - 7 = 7$	$6 + 7 = \square$	$7 + 7 = \square$	$\square + 5 = 14$
$13 - \square = 6$	$12 - \square = 7$	$14 - \square = 9$	$\square - 6 = 7$
$8 + 4 = \square$	$\square + 8 = 13$	$14 - \square = 7$	$14 - \square = 5$

5. How does this number line show that 7 + 8 is 1 more than 7 + 7?



6. How does this number line show that 8 + 7 is 1 more than 7 + 7?



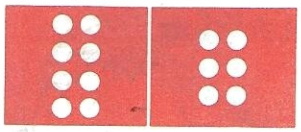


7. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of 8 + 6.

$$\begin{aligned} 8 + 6 &= 8 + (2 + \triangle) \\ &= (8 + 2) + \triangle \\ &= 10 + \triangle = \square \end{aligned}$$

8. Use the Law of Order for Addition to help you to remember 6 + 8. Because 8 + 6 = 6 + 8 you know 6 + 8 = ▣.

9. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. Show that in subtraction you begin with the sum. You take away one of the addends. What is left is the other addend.



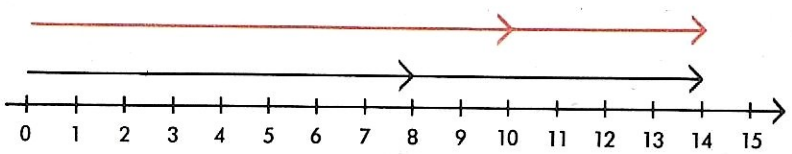
8 + 6 = 14 14 − 6 = 8

6 + 8 = 14 14 − 8 = 6

10. Solve each number sentence below.

8 + 6 = ▣	▣ − 7 = 6	9 + 2 = ▣	▣ + 6 = 14
6 + ▣ = 14	8 + ▣ = 13	▣ + 6 = 13	5 + ▣ = 14
▣ − 9 = 3	6 + 8 = ▣	9 + 5 = ▣	5 + 7 = ▣
▣ − 6 = 8	12 − 9 = ▣	14 − ▣ = 9	11 − 7 = ▣
14 − ▣ = 8	12 − ▣ = 8	14 − ▣ = 5	▣ − 8 = 3
12 − 5 = ▣	▣ − 8 = 6	▣ − 7 = 3	14 − ▣ = 6

11. Tell how this number line shows 8 + 6 = 10 + 4.



Some Problems

Write a number sentence for each problem. Solve the number sentence. Label your answer.

1. Nancy had 25 cents. Her mother gave her 15 cents. How many cents did Nancy then have in all?

2. Jim earned 35¢ last week and 48¢ this week. How much did he earn in both weeks?

3. There were 16 marbles in Bill's marble bag. There were 37 marbles in Tony's. What was the total number of marbles in the two bags?

4. There were 34 children in Miss Brown's class. One month 7 children moved away. How many children were there then in the class?

Keep on the Trail—Addition

1.

82	95	60	7	45	87	76	5
67	53	3	36	30	7	58	89

2. $6+23=\square$ $66+7=\square$ $8+70=\square$ $45+68=\square$

3. $90+40=\square$ $31+8=\square$ $60+22=\square$ $44+9=\square$

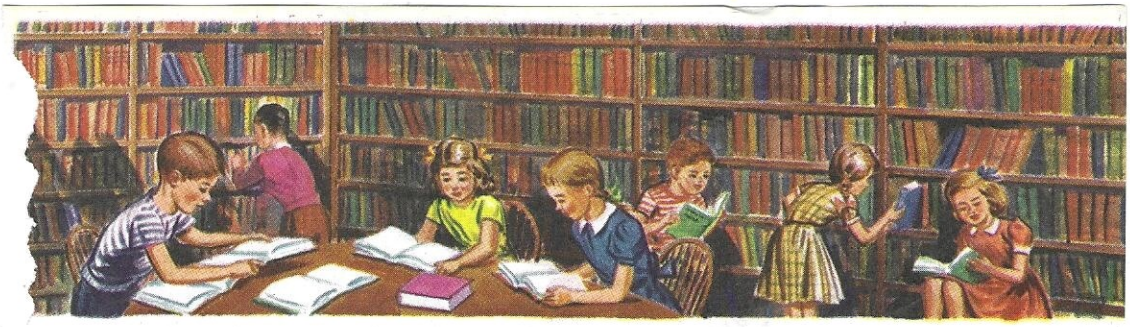
4. Think **thirteen**. Add to it each of the numbers named below.

2 4 1 5 0 3

5. Think **fourteen**. Add to it each of the numbers named above.

6.

6	9	1	2	1	5	$8+5+6=\square$
8	5	6	1	0	9	$5+9+2=\square$
5	0	7	4	5	4	$6+8+3=\square$
			2	4		$8+6+0=\square$



The Public Library

Write a number sentence for each problem. Solve and label your answer.

1. So far this year Fred has drawn out 8 books. His sister, Alice, has drawn out 6 books. How many books have the two children drawn from the library?

2. In Fred's grade, 11 girls and 8 boys have cards at the public library. How many children in all have cards?

3. There were 19 bird books in the library. The children drew out 8 of them. How many bird books were left?

4. The boys found 14 books about fish. The girls found 9 books about fish. How many more books about fish did the boys find than the girls?

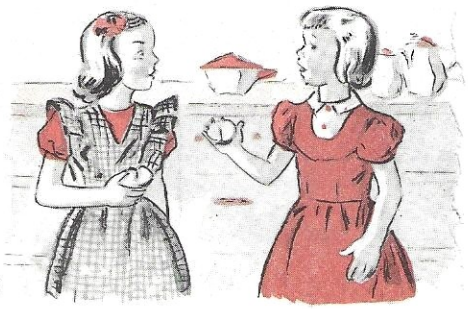
5. Patsy read 6 books about animals, 8 books about birds, and 3 books about fish. How many books has she read altogether?

6. There are 32 children in Tom's room. All but 4 children have library cards. How many children have cards?

7. One day 15 boys and 17 girls made a trip to the library. How many children made the trip?

8. Walter kept out a library book too long. He must pay a fine of 2 cents for each day his book is overdue. How much must he pay for a book 4 days overdue?

A


B

Sharing Halves

1. How many girls are there in picture A? How many apples?

2. In picture B you see how Grace shared her apple with Mary. She cut it into two equal parts. The two pieces were the same size. She cut the apple into **two halves.**

3. Into how many **equal parts** has Dorothy divided this fruit?

4. Use picture C to help you draw a picture. Show that Dorothy has cut each piece of fruit on the table into halves. How many halves does she have?

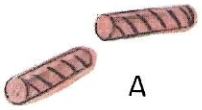
C

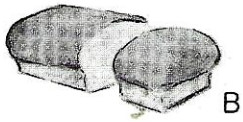
When any whole thing is divided into two equal parts, each part is called one half. We name one half with a numeral like this: $\frac{1}{2}$.

5. How many halves are there in any whole thing? We see then that 1 is equal to how many halves?

6. Fold a piece of paper to show halves. Compare the two halves.

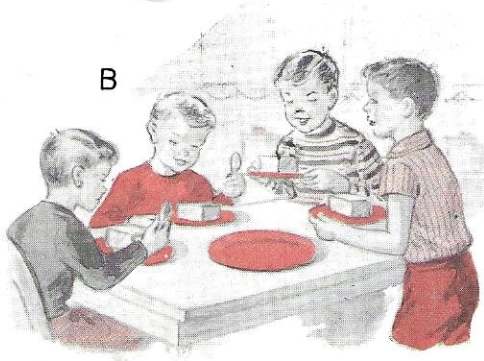
7. Which of the pictures below show halves?


A


B

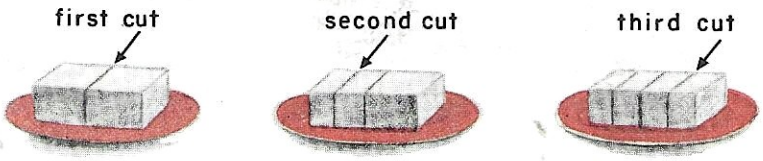
C

D



Sharing Fourths

1. Look at picture A. See how Nick has cut the ice cream into four equal parts. He wants to share with his friends. See how carefully he cut so each would have the same size piece. He cut the ice cream into fourths, like this:



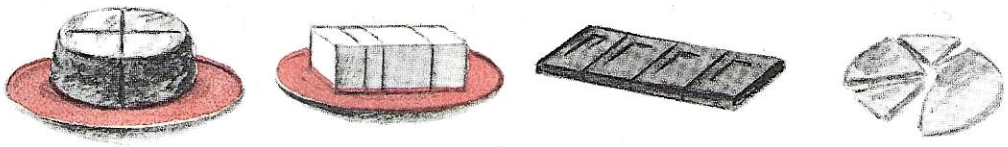
In picture B, each boy has what part of the ice cream?

When any whole thing is divided into four equal parts, each part is called one fourth. We name one fourth with a numeral like this: $\frac{1}{4}$.

2. How many fourths are there in any whole thing? We see then that 1 is equal to how many fourths?

3. Fold a piece of paper to show fourths. Name each part.

4. Which of the pictures below show fourths?



1 2 3 4

Dividing into Thirds

Lee is making roof boards for the dog house.

"This board is too long for the roof," said Lee.

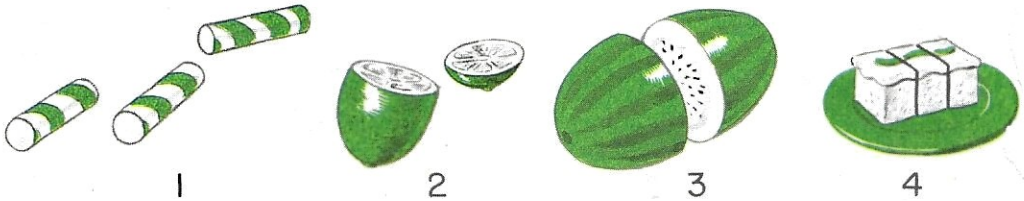
Lee carefully **measured** the board. He marked it to show where to saw. He divided the long board into how many equal parts?

He sawed along the marks. He divided the whole board into how many equal pieces? He divided the board into **thirds.** How many thirds do you see?

When any whole thing is divided into three equal parts, each part is called one third. We name one third with a numeral like this: $\frac{1}{3}$.

1. How many thirds are there in any whole thing? We see then that 1 is equal to how many thirds?

2. Which of the pictures below show thirds?



Keep on the Trail

1.

4	138	78	47	21	40	93
+62	−66	+35	−46	−21	+18	+4

2. $4 + 0 + 9 = \square$ $\quad 149 - 55 = \square$ $\quad 7 + 5 + 6 = \square$

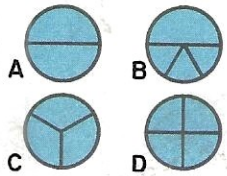
3. $72 - 5 = \square$ $\quad 83 - 56 = \square$ $\quad 8 + 3 + 8 = \square$

4. $8 + 2 + 0 = \square$ $\quad 34 - 18 = \square$ $\quad 2 + 5 + 7 = \square$

5.

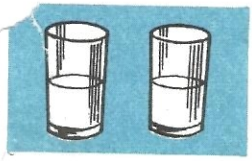
65	128	68	59	137	149	86
+59	−98	+35	+65	−70	−87	+27

Dividing Whole Things into Equal Parts



1. Mother divided a pie into fourths so that four children could each have a piece. Which picture shows how she divided the pie?

2. Charles divided a candy bar with his brother. He cut it in halves. His brother said, "Oh, Charles, you took the bigger half." Can there ever be a "bigger half" of a whole thing? Show the reason for your answer.

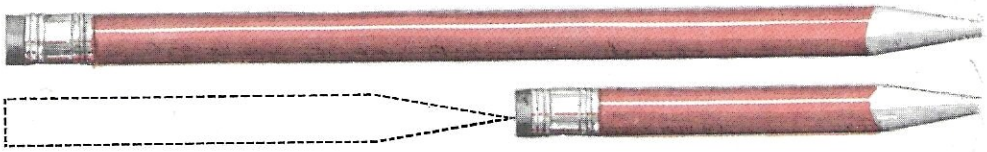


3. There was one glass of milk. Patty and her sister shared the milk equally. What part of a glass did each child receive?

4. Mildred cut a piece of cloth into thirds. Which picture below shows how Mildred cut the cloth?

A

B



We Use Fractions to Compare *Little* with *Big*

$\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ are called **fractions.**

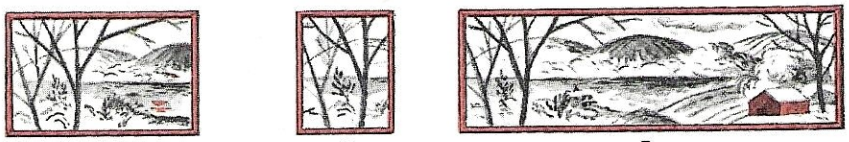
Fractions help us to compare **little** with **big.**

At the top of the page are pencils. It takes two of the short pencils to be as long as the long pencil. That is why we say that the short pencil is **half as long** as the long pencil. Show by measuring with a ruler that this is so.

Compare the short pencil with the long one. Say, "The short pencil is **half as long** as the long pencil."

Compare the long pencil with the short one. Say, "The long pencil is **two times as long** as or **twice as long** as the short one."

1. Which of the three pictures below is half as long as the longest picture?



A B C

2. Which sentences below are true?

   a. Picture **A** is two times as long as picture **B.**

   b. Picture **B** is half as long as picture **A.**

   c. Picture **B** is half as long as picture **C.**

   d. Picture **C** is two times as long as picture **A.**

   e. Picture **B** is one third as long as picture **C.**

Practicing Number Facts

9	6	9	7	7	5
+5	+8	+3	+7	+6	+7

8 + 6 = ▢	7 + 4 = ▢	7 + 5 = ▢	9 + 4 = ▢
3 + 9 = ▢	5 + 9 = ▢	5 + 8 = ▢	3 + 8 = ▢

13	12	12	12	14	13	11	14
−7	−8	−3	−7	−6	−4	−6	−9

14 − 8 = ▢	14 − 5 = ▢	13 − 9 = ▢	14 − 7 = ▢
13 − 6 = ▢	13 − 8 = ▢	13 − 5 = ▢	12 − 4 = ▢

Play the "Everybody Show" game (page 11).

A Game with Words

Play the game on page 39 with these words.

Team 1

1. as long as
2. carry a ten
3. equal parts
4. fourths
5. fraction
6. half as long
7. less than
8. number line
9. one half
10. one third
11. sharing equally
12. two equal parts

Team 2

1. as much as
2. compare lengths
3. group
4. halves
5. not enough ones
6. one fourth
7. the same size
8. thirds
9. twice as long
10. three equal parts
11. two halves
12. whole thing

Do You Know How?

There is a page numeral at the right of each group. Turn to that page if you need help with any of the examples in that group.

Addition

1. $\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$ $\begin{array}{r} 43 \\ +36 \\ \hline \end{array}$ $\begin{array}{r} 68 \\ +20 \\ \hline \end{array}$ (50) (53)

2. $\begin{array}{r} 43 \\ +4 \\ \hline \end{array}$ $\begin{array}{r} 7 \\ +90 \\ \hline \end{array}$ $\begin{array}{r} 5 \\ +53 \\ \hline \end{array}$ (64)

3. $81 + 32 = \square$ (76)
   $45 + 82 = \square$
   $70 + 30 = \square$

4. $\begin{array}{r} 33 \\ +57 \\ \hline \end{array}$ $\begin{array}{r} 34 \\ +87 \\ \hline \end{array}$ $\begin{array}{r} 48 \\ +95 \\ \hline \end{array}$ (88) (89)

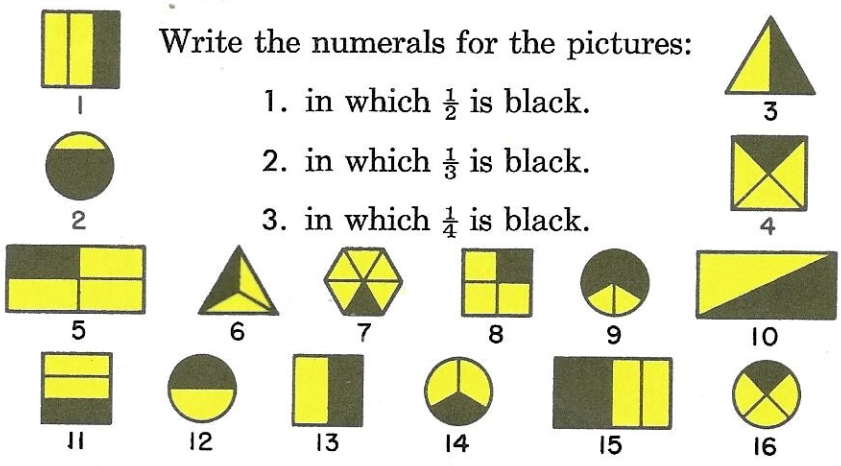
5. $\begin{array}{r} 35 \\ +7 \\ \hline \end{array}$ $\begin{array}{r} 96 \\ +8 \\ \hline \end{array}$ $\begin{array}{r} 87 \\ +6 \\ \hline \end{array}$ (92)

6. $\begin{array}{r} 6 \\ +37 \\ \hline \end{array}$ $\begin{array}{r} 9 \\ +75 \\ \hline \end{array}$ $\begin{array}{r} 8 \\ +96 \\ \hline \end{array}$ (92)

7. $\begin{array}{r} 4 \\ 0 \\ 9 \\ \hline \end{array}$ $\begin{array}{r} 6 \\ 2 \\ 5 \\ \hline \end{array}$ $\begin{array}{r} 4 \\ 5 \\ 4 \\ \hline \end{array}$ $\begin{array}{r} 5 \\ 0 \\ 8 \\ \hline \end{array}$ (37)

8. $7 + 6 + 4 = \square$ (70)
   $5 + 6 + 6 = \square$
   $5 + 9 + 3 = \square$
   $9 + 3 + 7 = \square$

For Those Who Do Not Need Help with Examples



Write the numerals for the pictures:

1. in which $\frac{1}{2}$ is black.
2. in which $\frac{1}{3}$ is black.
3. in which $\frac{1}{4}$ is black.

Do You Know How?

There is a page numeral at the right of each group. Turn to that page if you need help with any of the examples in that group.

Subtraction

1. $\begin{array}{r} 85 \\ -24 \\ \hline \end{array}$ $\begin{array}{r} 77 \\ -30 \\ \hline \end{array}$ $\begin{array}{r} 98 \\ -22 \\ \hline \end{array}$ (54) (55)

2. $\begin{array}{r} 79 \\ -75 \\ \hline \end{array}$ $\begin{array}{r} 36 \\ -36 \\ \hline \end{array}$ $\begin{array}{r} 99 \\ -90 \\ \hline \end{array}$ (58)

3. $56 - 3 = \square$ $37 - 6 = \square$ $79 - 4 = \square$ (59)

4. $138 - 78 = \square$ $149 - 66 = \square$ $127 - 55 = \square$ (78)

5. $\begin{array}{r} 94 \\ -78 \\ \hline \end{array}$ $\begin{array}{r} 83 \\ -46 \\ \hline \end{array}$ $\begin{array}{r} 64 \\ -35 \\ \hline \end{array}$ $\begin{array}{r} 70 \\ -21 \\ \hline \end{array}$ $\begin{array}{r} 84 \\ -29 \\ \hline \end{array}$ $\begin{array}{r} 90 \\ -78 \\ \hline \end{array}$ (95)

6. $63 - 59 = \square$ $33 - 28 = \square$ $80 - 76 = \square$ (98)

7. $50 - 45 = \square$ $94 - 87 = \square$ $43 - 35 = \square$ (98)

8. $\begin{array}{r} 90 \\ -7 \\ \hline \end{array}$ $\begin{array}{r} 53 \\ -4 \\ \hline \end{array}$ $\begin{array}{r} 30 \\ -3 \\ \hline \end{array}$ $\begin{array}{r} 84 \\ -8 \\ \hline \end{array}$ $\begin{array}{r} 22 \\ -8 \\ \hline \end{array}$ $\begin{array}{r} 70 \\ -4 \\ \hline \end{array}$ (99)

For Those Who Do Not Need Help with Examples

1. Copy the numeral which names the largest number in each group below.

a.	709	790	700	e.	800	810	801
b.	612	602	620	f.	305	350	355
c.	590	570	499	g.	910	900	901
d.	423	243	342	h.	289	298	299

2. Copy the numeral which names the smallest number in each group above.

3. Name the numbers in each group in order of size.

Progress Test

1. 78 (53) $+20$ (54)

2. $89 - 22 = \square$

3. 70 (76) $+60$ (59)

4. $79 - 6 = \square$

5. $36 + 58 = \square$ (89)

6. 129 (78) -57

7. 87 (92) $+6$ (95)

8. $64 - 35 = \square$

9. 75 (92) $+9$

10. $9 + 0 + 4 = \square$ (37)

11. $8 + 5 + 6 = \square$ (70)

12. 90 (95) -62 (98)

13. $43 - 37 = \square$

14. 80 (98) -74 (99)

15. $24 - 8 = \square$

16. The numeral 394 means ? hundreds ? tens ? ones. (74)

17. In which of the numerals below is 0 used to name "not any" tens? (75)

a. 310 b. 204 c. 460

18. How many cents are 1 dime and 4 cents? (93)

19. Dick sawed a board into fourths. Which board below shows how Dick sawed the board? (111)

A

B

20. Which is the larger piece of pie: $\frac{1}{2}$ of the pie or $\frac{1}{4}$ of the same pie? (110-111)

Coloring Parts of a Whole

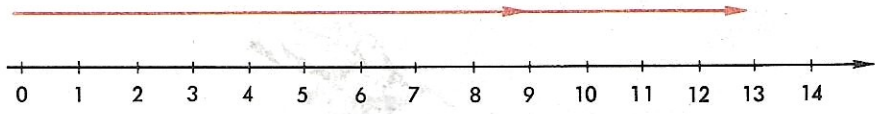
1. Draw a pie. Divide it into halves. Color $\frac{1}{2}$ of it.

2. Draw a pie. Divide it into fourths. Color $\frac{1}{4}$ of it.

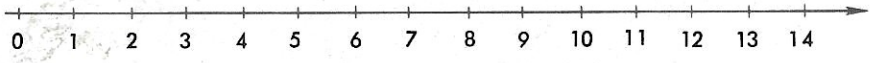
3. Draw a board. Divide it into thirds. Color $\frac{1}{3}$ of it.

Let's Make Some Number Lines

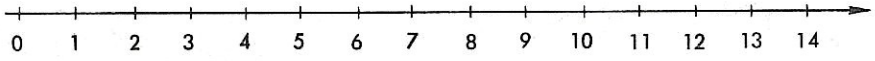
1. On the number line below:
   a. What does the arrowhead at the right tell us?
   b. What is the first number named at the left?
   c. How many numbers are named?
   d. How many spaces are shown between 0 and 9?
   e. How many spaces are shown between 9 and 13?
   f. What number sentence is shown by the two arrows above the number line?



On your paper draw six number lines like the one below. Leave enough room between the number lines so that you can put the arrows above each to show addends and a sum.



2. On number line 1 show the sum of 7 and 5.
3. On number line 2 show the sum of 5 + 8.
4. On number line 3 show the sum of 6 + 7.
5. On the number line below:
   a. In what direction did we move?
   b. What operation is shown?
   c. What number sentence is shown?



6. On number line 4 show 11 − 7.
7. On number line 5 show 14 − 8.
8. On number line 6 show 14 − 5.

Chapter 4

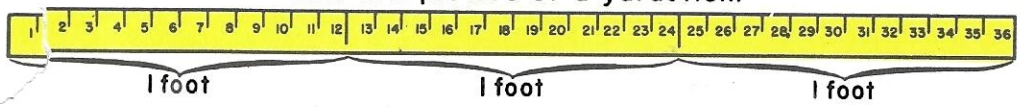
Getting Ready for Christmas Morning

The Smalls are trimming their Christmas tree.

1. Jonathan put his 5 Christmas cards on the tree. Carolyn put her 6 cards on the tree. How many cards did both children put on the tree?

2. Below is a picture of a yardstick. In what ways is a yardstick like a number line?

This is a picture of a yardstick.



3. The tree is 9 feet tall. Father is 6 feet tall. How many feet taller than Father is the tree? Is there a yardstick in your schoolroom? A yardstick is 3 feet long. On the floor measure a distance 3 yardsticks long. Show by adding that 3 feet plus 3 feet plus 3 feet is 9 feet. Can you figure how many yardsticks tall Father is?

4. The packages below are ready to put under the tree. There are 5 packages for Jonathan and 5 packages for Carolyn. How many packages are there for both children?

5. There are 7 packages for the grownups. How many more packages have the children than the grownups?

6. Make up problems about Christmas for these number sentences.

a. $4 + 9 = \square$
b. $12 - \square = 3$
c. $\square + 5 = 13$
d. $\square - 6 = 7$
e. $9 + 5 = \square$
f. $3 + 5 + 4 = \square$
g. $7 + \square = 14$
h. $4 + 6 + 3 = \square$
i. $13 - 8 = \square$

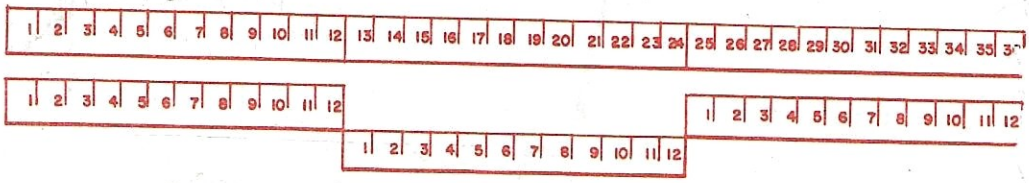
Two Kinds of Measuring Sticks

1. Below is a picture of a **foot ruler.** It is much smaller than a real ruler. How many inches are marked on a foot ruler? How many inches are there in one foot?

From the left end of this ruler to the long mark for 1 is **one inch.** From the left end of the ruler to the long mark for 2 is how many inches? On the part of the ruler above show 3 inches. Show 4 inches.

2. In what ways is a foot ruler like a number line? With a ruler could you draw two arrows to show that $5 + 6 = 11$? What numeral is missing on a ruler that is important on a number line? Where would this numeral be placed on a ruler?

3. Below is a picture of a **yardstick.** Under it are 3 rulers. The yardstick is 36 inches long. We call **36 inches one yard.**



4. Use the picture above to show that there are **3 feet in 1 yard.**

5. One foot is what part of 1 yard?

6. What do we measure with rulers? with yardsticks?

7. Name something about 1 inch long; 1 foot long; 1 yard long. Draw each length on the blackboard.

8. On the yardstick, how many spaces are there between 12 inches and 25 inches? $12 + \square = 25$

Look at the picture of a ruler in problem 1.

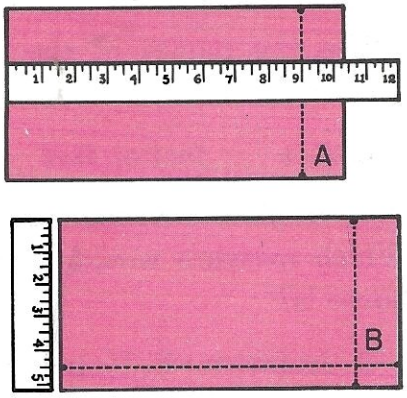
9. Find the mark in the middle of an inch. This mark divides the inch in half. From the left end of the ruler to this first half-inch mark is $\frac{1}{2}$ **inch.** Use the picture or a ruler to show $1\frac{1}{2}$ inches; $2\frac{1}{2}$ inches; $3\frac{1}{2}$ inches. Draw these lengths.

10. Use a ruler to draw these lengths on the blackboard:
a. 7 inches b. $9\frac{1}{2}$ inches c. 6 inches d. $11\frac{1}{2}$ inches

11. Use a yardstick to draw these lengths on the blackboard:
a. 15 inches b. $20\frac{1}{2}$ inches c. 28 inches d. $34\frac{1}{2}$ inches

How to Make a Christmas Card

Use green or red paper.



1. Measure 9 inches on each **long side.** Make a dot to show 9 inches. See how in **A.** Join the dots.

2. Measure $4\frac{1}{2}$ inches on each **short side.** Make a dot to show $4\frac{1}{2}$ inches. See how in **B.** Join the dots.

3. Cut as marked. You now have a piece of paper how many inches long? How many inches wide?

4. Fold the paper so the short edges meet. Measure to see how many inches long the folded card is. Find how many inches wide it is. What shape is it? How can you tell?

5. Put a Christmas picture on the card. Inside print MERRY CHRISTMAS.

Why We Use Different Measures of Length

Use the names of the measures below to answer the questions.

inches **foot or feet** **yards** **blocks** **miles**

1. In picture **A**, Joe is finding how high the bird house is. Which measure would he use to find how high this bird house is?

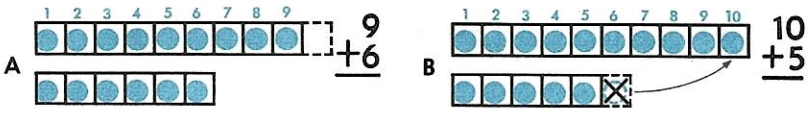
2. In picture **B**, Roger is measuring to see how tall Grace is. Which of the measures should he use?

3. In picture **C**, Pat is walking to school. Which of the measures could be used to tell how far he walks?

4. In picture **D**, Nan's mother is buying cloth for a new dress for Nan. Which measure will the clerk use to measure the cloth?

5. In picture **E**, Howard and his father and mother are going by train to another town. Which measure would be used to tell how far they go?

6. Roger is 52 inches tall. Grace is 47 inches tall. How much taller is Roger than Grace?



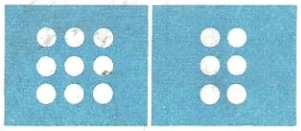
Related Number Facts about Fifteen

1. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of $9 + 6$.

$$\begin{aligned} 9 + 6 &= 9 + (1 + \blacktriangle) \\ &= (9 + 1) + \blacktriangle \\ &= 10 + \blacktriangle = \blacksquare \end{aligned}$$

2. If you know $9 + 6 = 15$, what law helps you to find the sum for $6 + 9$? So, $6 + 9$ is also $\blacksquare$.

3. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. To help you remember the two subtraction facts, think: We begin with the sum. We take away one of the ___?___. The remainder is the other ___?___.

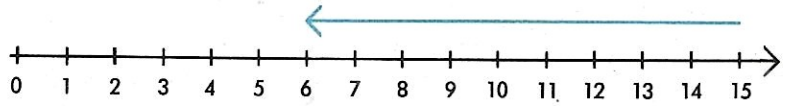


$9 + 6 = 15$ $\quad$ $15 - 6 = 9$
$6 + 9 = 15$ $\quad$ $15 - 9 = 6$

4. Solve each number sentence.

$9 + 6 = \blacksquare$	$\blacksquare + 7 = 13$	$5 + 9 = \blacksquare$	$\blacksquare - 8 = 6$
$8 + 5 = \blacksquare$	$7 + 6 = \blacksquare$	$\blacksquare + 6 = 15$	$9 + 4 = \blacksquare$
$\blacksquare + 9 = 15$	$5 + 8 = \blacksquare$	$9 + 5 = \blacksquare$	$7 + \blacksquare = 12$
$\blacksquare - 6 = 9$	$13 - \blacksquare = 9$	$14 - \blacksquare = 8$	$14 - \blacksquare = 7$
$15 - 6 = \blacksquare$	$\blacksquare - 8 = 6$	$\blacksquare - 9 = 6$	$14 - \blacksquare = 9$
$\blacksquare - 6 = 7$	$15 - \blacksquare = 6$	$\blacksquare - 9 = 5$	$13 - 4 = \blacksquare$

5. How does this number line show that $15 - 9 = 6$?



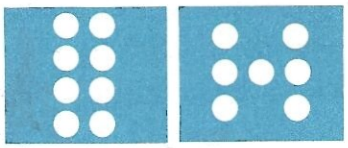
6. Draw a number line and on it show $6 + 9$.

7. We can use the Law of Grouping to help us find the sum of $8 + 7$.

$$\begin{aligned} 8 + 7 &= 8 + (2 + \triangle) \\ &= (8 + 2) + \triangle \\ &= 10 + \triangle = \square \end{aligned}$$

8. If you know the sum of $8 + 7$, what law helps you find the sum for $7 + 8$? So, $7 + 8$ is also $\square$.

9. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. To help you remember the two subtraction facts, think: We begin with the ? . We take away one of the ? . The remainder is the other addend.



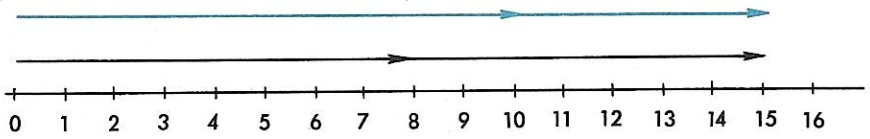
$8 + 7 = 15$ $\quad$ $15 - 7 = 8$
$7 + 8 = 15$ $\quad$ $15 - 8 = 7$

10. Solve each number sentence.

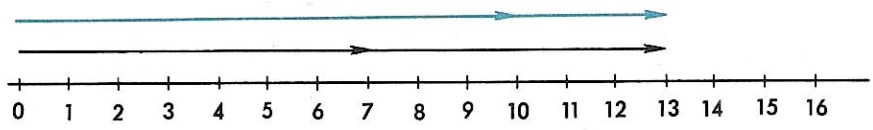
$8 + 7 = \square$	$9 + 5 = \square$	$\square + 6 = 14$	$8 + 7 = \square$
$7 + \square = 15$	$7 + 6 = \square$	$6 + 9 = \square$	$7 + \square = 15$
$7 + 5 = \square$	$\square - 7 = 7$	$9 + 4 = \square$	$9 + 6 = \square$
$15 - 8 = \square$	$15 - \square = 6$	$\square - 5 = 9$	$15 - \square = 8$
$15 - \square = 7$	$\square - 7 = 6$	$15 - 9 = \square$	$15 - \square = 7$
$13 - \square = 9$	$12 - \square = 7$	$\square - 8 = 6$	$13 - 8 = \square$

11. How does the number line below show:

$8 + 7 = 10 + 5$?



12. What does this number line show?



13. Show $7 + 7 = 10 + 4$ on a number line.

Keep on the Trail

Find the sums. Check your work.

1.

86	80	9	67	35	89	79	8
73	9	36	42	60	5	64	65

2. $4 + 55 = \square$ $\quad 58 + 7 = \square$ $\quad 60 + 97 = \square$

3. $90 + 60 = \square$ $\quad 70 + 8 = \square$ $\quad 37 + 67 = \square$

4. Think **fourteen**. Add to it each of the numbers named below.

3 1 0 5 2 4

5. Think **fifteen**. Add to it each of the numbers named below.

2 4 0 3 1

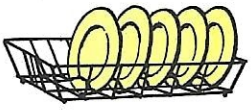
6. Find the sums.

6	4	7	5	9	$3 + 3 + 0 + 7 = \square$
9	9	8	8	6	$8 + 7 + 1 + 3 = \square$
3	6	4	4	2	$8 + 1 + 6 + 0 = \square$
			2	2	$7 + 8 + 2 + 1 = \square$

Carol Washes the Dishes for Mother

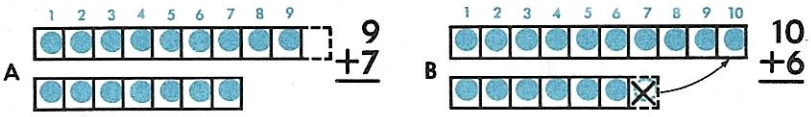
Write a number sentence for each problem. Solve the number sentence. Label your answer.

1. Carol has 15 plates to wash. In the picture, you see she has washed how many plates? How many plates are left to wash?



2. Carol washed 15 plates. Six plates were small. The others were big. How many plates were big?

3. Carol washed 9 large spoons and 6 small spoons. How many spoons in all did she wash?



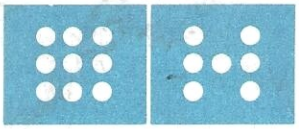
Related Number Facts about Sixteen

1. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of 9 + 7.

$$\begin{aligned} 9 + 7 &= 9 + (1 + \blacktriangle) \\ &= (9 + 1) + \blacktriangle \\ &= \quad 10 \quad + \quad \blacktriangle = 16 \end{aligned}$$

2. If you know the sum for 9 + 7, what law helps you find the sum for 7 + 9? So, 7 + 9 is also ■.

3. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact. To help you remember the two subtraction facts, think: We begin with the ___?___. We take away one of the ___?___. The remainder is the other ___?___.

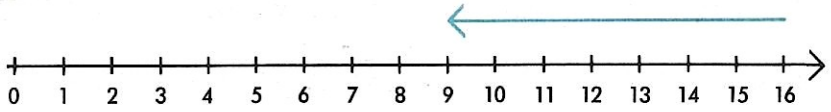


$9 + 7 = 16$ $\quad 16 - 7 = 9$
$7 + 9 = 16$ $\quad 16 - 9 = 7$

4. Solve each number sentence.

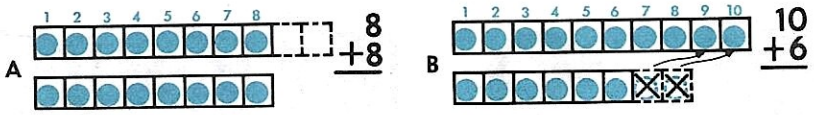
$9 + 7 = \blacksquare$	$6 + 8 = \blacksquare$	$6 + 9 = \blacksquare$	$7 + 6 = \blacksquare$
$\blacksquare = 7 + 9$	$\blacksquare = 9 + 5$	$\blacksquare = 8 + 7$	$16 = \blacksquare + 7$
$\blacksquare - 9 = 7$	$13 = 8 + \blacksquare$	$9 + \blacksquare = 15$	$\blacksquare - 9 = 6$
$16 - 9 = \blacksquare$	$14 - \blacksquare = 8$	$\blacksquare - 6 = 9$	$13 - 9 = \blacksquare$
$\blacksquare - 7 = 9$	$14 - 9 = \blacksquare$	$15 - \blacksquare = 8$	$\blacksquare - 5 = 8$
$15 - \blacksquare = 7$	$16 - \blacksquare = 9$	$13 - 7 = \blacksquare$	$16 - \blacksquare = 7$

5. How does this number line show 16 − 7 = 9?



6. Show the following on number lines.

a. $6 + 8 = \blacksquare$
b. $8 + 5 = 10 + 3$
c. $9 + 2 = 10 + 1$
d. $7 + 7 = \blacksquare$

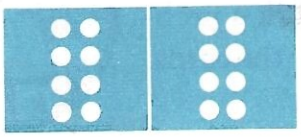


7. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of 8 + 8.

$$\begin{aligned} 8 + 8 &= 8 + (2 + \square) \\ &= (8 + 2) + \square \\ &= \quad 10 \quad + \quad \square = 16 \end{aligned}$$

8. How are the 16 disks grouped below?

9. Say the two related number facts printed below. Point to or cover the groups of disks as you say each fact. In subtraction you begin with what? You take away what? The remainder is what?



$$8 + 8 = 16$$
$$16 - 8 = 8$$

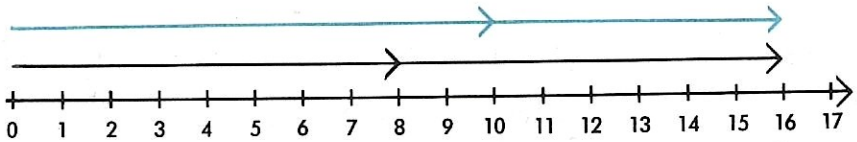
10. Cover one group of disks. Compare the number of disks you covered with the number you see. How does this show that 16 is 2 groups of 8?

11. In the number sentences below, ask yourself: Does **n** hold a place for a **missing sum** or a **missing addend**? If a sum is missing, what will you do? If an addend is missing, what will you do? Solve each number sentence.

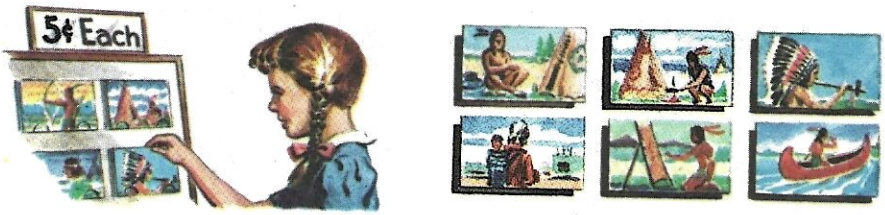
$8 + 8 = \mathbf{n}$	$7 + \mathbf{n} = 16$	$7 + 5 = \mathbf{n}$	$7 + 8 = \mathbf{n}$
$\mathbf{n} = 9 + 7$	$\mathbf{n} = 8 + 8$	$13 = 6 + \mathbf{n}$	$\mathbf{n} = 9 + 3$
$16 - 8 = \mathbf{n}$	$\mathbf{n} - 4 = 8$	$16 - \mathbf{n} = 9$	$\mathbf{n} - 6 = 9$
$12 - \mathbf{n} = 9$	$16 - \mathbf{n} = 8$	$16 - 7 = \mathbf{n}$	$14 - \mathbf{n} = 6$

12. How does this number line show:

$$8 + 8 = 10 + 6?$$



13. Show on a number line that $7 + 9 = 10 + 6$.



Write and Work Your Own Problems

1. You see Beth looking at postcards. How much does each card cost?

She buys the cards you see at the right above. How can you find out how much these 6 cards cost? Write and work a problem about Beth buying the cards.

2. Beth pays for the cards with a coin like the one at the right. Write and work a problem about the money Beth pays for the cards. How much change did she receive?

3. To mail these cards Beth used 6 stamps. She took them from a sheet of 25 stamps. How many stamps were left on the sheet?

4. At 4 cents each, how can you find out how much these 6 stamps cost? How can you find the cost of 4 stamps? of 3 stamps? of 5 stamps?

Keep on the Trail

Watch the signs. Check each answer.

1.

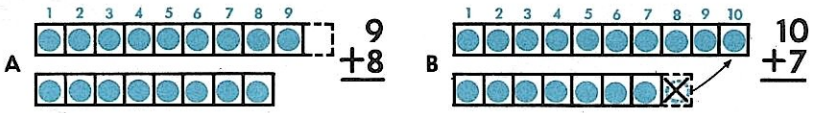
48	86	168	57	86	29	95
+48	−79	−85	+39	−7	+56	−89

2. $56 + 49 = \square$ $\quad 149 - 96 = \square$ $\quad 64 - 58 = \square$

3. $95 - 78 = \square$ $\quad 79 + 65 = \square$ $\quad 87 + 78 = \square$

4.

78	93	130	67	86	46	70
+57	−69	−80	+37	−48	+98	−9



Related Number Facts about Seventeen

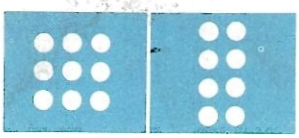
1. Use pictures A and B above to help you see how the Law of Grouping helps you find the sum of 9 + 8.

$$\begin{aligned} 9 + 8 &= 9 + (1 + \blacksquare) \\ &= (9 + 1) + \blacksquare \\ &= \quad 10 \quad + \quad \blacksquare = 17 \end{aligned}$$

2. If you know the sum of 9 + 8, what law helps you find the sum of 8 + 9? So, 8 + 9 = ■.

3. How will knowing that 8 + 8 = 16 help you to know 9 + 8 = 17, and to know 8 + 9 = 17?

4. Say the four related number facts printed below. Point to or cover the groups of disks as you say each fact.

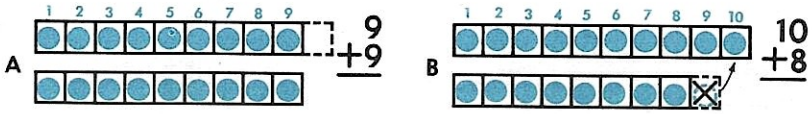


9 + 8 = 17 17 − 8 = 9
8 + 9 = 17 17 − 9 = 8

5. To find the value for **n**: If a sum is missing, add the ___?___. If an addend is missing, subtract an ___?___ from the ___?___. Solve each number sentence.

9 + 8 = **n**	6 + 8 = **n**	7 + 8 = **n**	9 + **n** = 15
n + 9 = 17	17 = **n** + 8	**n** + 9 = 16	**n** = 8 + 7
n = 9 + 5	8 + 6 = **n**	**n** = 8 + 9	**n** = 9 + 7
17 − **n** = 9	**n** − 6 = 8	**n** − 9 = 7	15 − **n** = 8
17 − 8 = **n**	14 = **n** + 9	16 = **n** + 7	16 = 8 + **n**
17 − **n** = 8	15 = 7 + **n**	15 = 6 + **n**	**n** − 8 = 9

6. Show on number lines that:
   a. 8 + 9 = 10 + 7 b. 9 + 7 = 10 + 6

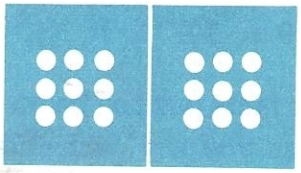


The Last Double to Study

1. Pictures A and B above show how the Law of Grouping can help you to find the sum of 9 + 9. Write the number sentences that tell how the pictures show 9 + 9 may be grouped to get 10 + 8 = **n**.

2. Say the two related number facts printed below. Point to or cover the groups of disks as you say each fact. Show that in subtraction you begin with the ___?___. You take away one of the ___?___. The remainder is the other ___?___.

3. How are the 18 disks grouped below?



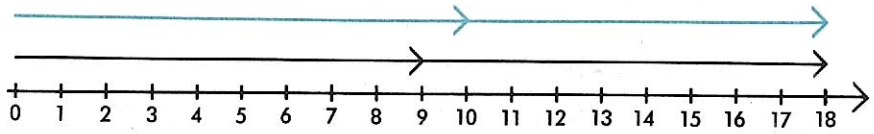
9 + 9 = 18
18 − 9 = 9

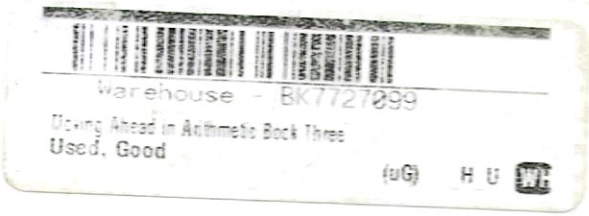
4. Cover one group of 9 disks. Compare the number of disks you covered with the number you see. How does this show that 18 is 2 groups of 9?

5. Before you solve each number sentence below, decide whether an addend or a sum is missing. Write the word addend or sum on your paper. Then solve the number sentence.

9 + 9 = **n**	7 + 9 = **n**	**n** = 9 + 8	**n** = 8 + 8
n = 8 + 9	18 = 9 + **n**	6 + 8 = **n**	9 + 6 = **n**
18 − **n** = 9	16 − **n** = 8	**n** − 8 = 9	16 − 7 = **n**
17 = 8 + **n**	18 = **n** + 9	16 − 9 = **n**	**n** − 6 = 9

6. How does this number line show 9 + 9 = 10 + 8?




Warehouse - BK7727099
Moving Ahead in Arithmetic Book Three
Used, Good
(uG) H U